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MONDAY AFTERNOON SESSION

October 6, 1941

Presiding:—GENERAL CHAIRMAN IRVIN A. BRINKMAN, Personnel Director, Mackintosh-Hemphill Company, Pittsburgh, Pa.

A Good Housekeeping Program and How to Keep It Effective

By M. W. DUNDORE

Production Manager, Beloit Iron Works, Beloit, Wis.

Good housekeeping in the plant, as in the home, has often been summarized by the phrase, "A place for everything and everything in its place." If management fails to provide the "place," the employee finds adherence to this principle impossible. Providing the "place" should be carried out in its broadest sense. The start of a good program is an analysis of physical plant facilities, to determine the adequacy of existing equipment, such as shelves, bins, storage rooms, working places, and the like. Technically, therefore, management has the first responsibility in the good housekeeping program, the employee plays a continuously important role.

The purpose of an industrial good housekeeping program is to promote order and cleanliness throughout the organization. Such a program should accomplish three objectives; first—the elimination of accident and fire hazards; second—the conservation of

space, time, material and effort; and third—the improvement of employee morale.

A good management must:

Believe in good housekeeping.

Recognize their personal responsibility.

Be active.

Be a leader.

Have intimate knowledge of good housekeeping.

While the company starting from scratch can solve many safety problems at the outset by plant design, the plight of the management which is rapidly expanding production in limited plant facilities is not always as despairing as it appears. The job is largely one of housekeeping. Production lines can be straightened, cluttered aisles cleared, power lines removed from reach, moving machinery properly guarded.

In a newly designed plant, the general layout of physical properties or any other place is a very important factor in good housekeeping. Machinery should be so located that there is an even flow of materials from the raw to the finished state, and buildings should be arranged to provide both efficiency and safety.

Poor housekeeping is a forerunner to hazardous arrangement—plant congestion, overcrowding, too-rapid and unplanned installation of new machinery, improper storage of raw materials and finished stock.

The coordinating agency between management and the employee, in the good housekeeping program, is the foreman. His primary duty is the delegation of responsibility to individual workers in his department and regular follow-through on instruction. Foremen should set an example by keeping their own offices and work places in good order. An ill-kept departmental office will generally be reflected in conditions in the shop. There should be a specific place for all materials and tools, and foremen should insist these be kept in the designated location.

Time and motion study engineers have demonstrated that good housekeeping results in greater and more efficient production. Plants using this system, basing their pay rates on production levels, make allowances to men for clean-up. This system requires the individual employee to give definite consideration to housekeeping in his job cycle.

Employees should be familiar with good housekeeping procedure.

Employees must be taught to keep benches, shelving, racks and other permanent equipment clear from collections of junk, wood, waste, rags and broken material. If material cannot be used, get rid of it.

Systematic means should be provided each day for the removal of rubbish-dirt, boxes, chips, and oily waste.

A high standard of cleanliness in offices and factories means more sanitary working conditions.

To keep a plant clean, there must be an organization for that purpose. Cities have highly developed street cleaning departments. Why should not the same type of organization be adapted to industrial use.

A program of improved lighting begins by taking the fullest advantage of available daylight. This would include a regular schedule of window washing—winter and summer. Most factory construction devotes a large portion of wall area to glass, and unless windows are washed regularly, much natural light is wasted.

The advent of fluorescent lighting and diffused lighting has been a boon to good housekeeping, for through its economy of operation, the process of cleaning up has been stimulated in many industries.

Stairways should be kept clear of all materials, and should be properly illuminated. Accidents from tripping and falling are more likely in these locations than on level surfaces. To comply with fire regulations, as well as good safety procedure, handrails of suitable height should be provided. Stairs should be equipped with treads of non-slip substances where slips might result in serious falls. Construction of stairways should be in accordance with standard engineering specifications.

Many companies report difficulty in handling their employees' parking problem. Where plants maintain parking spaces for employees, specific traffic regulations should be set up and enforced. One company appoints certain employees to police the plant parking areas and to direct traffic in the

morning and evening when the movement of vehicles is particularly heavy.

Why not a uniformed director of process traffic in individual plants?

Improper piling and storage of materials is a major cause of poor housekeeping. Material to be stored in workrooms should be kept as low as possible, and yet not interfere with production requirements. Raw materials should be brought in from the storeroom as needs arise and in no greater quantity than is necessary. A minimum of material in the workroom promotes both efficiency and safety in the even flow of production.

Metal cabinets should be provided in each department for the storage of grease containers used in that department. This avoids the unsightly appearance of oil and waste materials, strewn at random about workrooms.

In the storage of bulky objects, such as rods, lumber, and the like, many companies provide specially designed guards to prevent the shifting and rolling of this material into aisleways or places where men may be working. Small-sized material may be shelved in bins and cribs.

Finished products should be removed from the department and stored in specifically designated places. All material should be piled so as to minimize the danger of stock falling and injuring employees. Stock should also be located in a manner not to present tripping hazards to passing workers.

Most plants specifically designate a room for the storage of tools, equipment and supplies. Such a room, if well-designed and well-maintained, can contribute materially to the housekeeping program, by eliminating helter-skelter storage of tools and equipment around the plant. Racks, bins, and hangers should be provided, and one or more employees placed specifically in charge of this department. Good housekeeping should prevail in the rooms.

Tool cribs and tool racks will do much to encourage good housekeeping and promote efficiency.

Proper clearance should be allowed between the ceilings and tops of the stacks, and in no instance should height of materials be beyond safe levels.

Lockers and locker rooms are provided in many organizations, where street clothing may be kept while at work, and work clothing stored during off hours. The use of locker rooms will improve the appearance of working places, employees will not be forced to hang clothing on walls on or around machinery in workrooms.

Providing mechanical ventilation by means of air ducts and fans is quite necessary in all wash rooms.

Remove locker odors and keep clothes fresh by circulating air through rooms and lockers. Lockers should have perforations in bottom and in doors. The tops should slope to avoid the accumulation of old clothes on locker tops.

An abundance of wash bowls, plenty of lockers, and a general appearance of cleanliness, add much to the plant's desirability as a place to work.

Employees appreciate locker rooms to a greater degree than most plant managers realize. Each employee should clean out his locker at least once a week. Our foremen are provided with "Locker Inspection Today" signs which they place in locker rooms at frequent intervals so that lockers remain open for inspection by them.

Cleanliness of machines and other equipment is an important housekeeping requirement, both from the standpoint of safety and efficiency. Machine operators should not use an excessive amount of oil in the cleaning of their machines. This practice not only tends to increase cost, but creates fire hazard. Oil and grease should not be allowed to accumulate on the floor about machinery, where it will create a slipping hazard for operators and to other employees.

Waste cans with self-closing covers should be provided for each department. Two should be at each location, one can for clean and the other for soiled waste. These cans should be painted and the contents stencilled or painted on the cans.

Painting is important to good housekeeping. Painted walls and equipment encourage the employee to be clean and orderly in his work and personal habits. Many companies paint corners white in toilets and washrooms, various places in the workrooms, and on stairways and aisles. This adds to the general appearance and discourages such

unsanitary practices as spitting. The painting of handrails, machine guards and other equipment not only prevents rust, but adds to general appearances and safety. The use of standard colors in painting various utility lines and emergency equipment is considered good practice in many industrial plants since it tends to identify similar equipment throughout the plant.

One of the main reasons for repainting is the fact that there is usually a good job done in dusting and dirt removal.

Structure should be inspected at regular intervals and painting done before the ravages of the elements have proceeded too far.

Painting of interior walls and ceiling is needed to provide proper lighting conditions, not to mention neat, clean appearances.

Remind employees of the necessary clearances by bright yellow paint to mark the clearance lines in buildings wherever the floor surface permits.

The piling and storage of materials in plant yards require special consideration. Such piling and storage should be in accordance with established procedures, particularly to keep materials from falls or protruding into open walkways and passageways.

A systematic method should be formulated for the storage of materials in the yard. The appearance of a plant yard reflects in the quality of the product and its relationship with customers. Each bulk material should be assigned a specified area.

Such materials as oils, explosives, acids, combustible gases, and toxic substances should be handled and stored only under established safe procedures. Reference should be made to local, state, and federal regulations concerning the handling and use of these materials.

Where vending machines for milk and other bottled drinks are located, in the plant, employees should be instructed to place empty containers in cases or on pegs provided for the purpose, adjacent to the machine, and in no instance be permitted to leave empty bottles around work places or on the floor.

Factory refuse dumps are breeding places for rats and mice and usually breed disorderliness.

Fumes and dust, whether toxic or nuisance, should be removed from the work place by systems designed for this purpose. Removal systems are recommended most often in the interest of industrial hygiene, but are also valuable from the standpoint of employee efficiency and in the removal of fire and explosion hazards.

For removing heavy vapors or dust, the downward systems of ventilation is most practical and humanitarian, especially when such removal is done through a curtain of water.

The removal of condensation is still a problem with many industries and warrants further consideration in engineering design for proper air-conditioning.

Safety meetings should be utilized to maintain interest in the housekeeping program. Many companies provide for the discussion of good housekeeping in each meeting.

Clean-up campaigns in the form of "safety stunts" are utilized by many companies.

Some companies make definite time allowances for job clean-up; men are encouraged to clean their work places a short time before the close of day, allowing them to leave the job when the whistle blows, with everything in good order.

Warning signs and notices should be used wherever necessary throughout departments, and kept in legible condition at all times. Signs should be of standard design and be suitably located. Unsightly or obsolete equipment of this type should be replaced. Wide varieties of safety signs for all housekeeping and safety activities are available from manufacturers.

Any company desiring to maintain any kind of a safety record will find it necessary to declare war on "poor housekeeping." Organize your Safety Committee into a "Panzer Division" and execute a pincer movement on all such forms of potential accident hazards influenced by such housekeeping.

TUESDAY LUNCHEON SESSION

October 7, 1941

Simplifying and Streamlining Safety Fundamentals

By E. E. MOORE

Vice President, Industrial Relations, Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.

Those in positions of supervisory responsibility for safety, endeavoring to adjust their thoughts to the tempo of the times, have been searching for a new technique, or a new method of safety promotion that would provide a panacea for the varied safety ills confronting industry. This attitude of constantly searching for a remedy has been commendable. But perhaps in our search we have wandered too far afield at times, and have overlooked certain fundamentals. Perhaps all these fundamentals need is a re-interpretation.

In an exploration of such time-worn fundamentals as Engineering, Education and Enforcement, one may not think he could find anything new. Yet, it is possible to determine the objective before us, not in terms of something new, but rather in the re-application of the "old reliables" to the problems at hand.

Today each contemplated productive unit is planned with the intent of providing maximum protection for industrial workers. Safeguards are not added in this day of enlightenment after equipment is installed, or, as happened too often in the past, following some serious accident. Rather, they are an integral part of the design, if not from the inception of the idea in the inventor's mind, they are included in the design by the engineer. Plant layouts eliminate the possibilities of many injuries heretofore occasioned by numerous interdepartmental transfers of material in the process of manufacture. Passageways are planned meticulously for the facility and adequacy of employee movement, while material is now conveyed by conveyor systems, tramways, or over routes designed for such purposes.

We talk no longer about ventilation. We ventilate. We no longer deplore the loss of visual acuity in our employees' eyes. We are providing adequate industrial lighting. We no longer lament the injuries caused by excessive noise. We have instituted programs of sound control. We no longer contemplate programs of control designed to eliminate occupational industrial hygienic hazards. We now actively employ methods to combat such conditions. Thus, through engineering, we continue to wage aggressive offense against accidents and the possibilities of injuries tomorrow.

Education, we believe, offers the greatest opportunity for safety improvement. Education, often the most backward of the three "E's", was never fully exploited because it was never fully understood.

Today, it is streamlined. It is taking its place appropriately alongside engineering and sane enforcement rules. Education, actually, is the big "E" of the safety movement. It should not, however, be confused with promotional methods dealing largely with the psychosis of fear, still employed by some managements. It should not be confused with posters and organizational campaigns. On the contrary, it should be visualized in its true perspective, namely, "Job Training" or "On the Job Instruction," and we are not referring to "on the job safety instruction," but instruction and training in how to do the job properly, since it follows that when done properly, it will be done safely.

Supervisors, imbued with safety-consciousness, are realizing that through "on the job" instruction, accident frequencies need not suffer because of productive improvements. This has been observed by us on numerous occasions, and bears out the contention that the better a man knows his particular job, the better and more safely for himself and his co-workers will he be able to perform his function. In other words, if a man who previously was able to perform only five or six operations in a semi-skilled fashion on a machine capable of ten operations and then is instructed adequately "on the job" until he masters all the techniques, he immediately

graduates from a fifty per cent workman, to a hundred per cent workman, not only from a productive but from a safety standpoint as well.

Many managements are approaching their educational tasks in this respect through preparation of the foreman or job instructor in the proper comprehension and exercise of his responsibility. We believe that the best method of accomplishing this purpose through adequate training of the foreman or job instructor in the importance of and method of job analysis. In the Carnegie-Illinois Steel Corporation major attention is given by the supervisors in the development of three types of training analyses, namely:

1. Analysis of repetitive individual productive jobs.

2. Analysis of industrial jobs where the operation is not repetitive or on a productive line basis.

3. Analysis of crew jobs where production is obtained as a result of co-ordinated efforts of more than one individual working on a productive unit where the process is usually repetitive in nature.

Through the development of these analyses, the supervisor is equipped with sufficient information to seek out hazardous conditions and will be fortified with the necessary data to develop the proper method and, incidentally, the safe method of doing a specific job. Each analysis contains as a part of the items of functional performance, the following:

1. Items of safety performance to be stressed in the instruction.

2. Safety equipment which must be used or worn in performing the function.

3. Hazards of a special information such as—equipment or unit capacity, cable strength, corrosive elements, presence of toxic gases or hazards relating to the material being processed.

Education, of course, never becomes effective until effectively applied. Our goal in safety supervision, therefore, should be less walking around the department and more supervising. Less watching and more training. Less faith in the discovery of unsafe practices as a panacea and more education to prevent the occurrence of unsafe practices.

Education, we are finding, extends to the home as well. It must be extended beyond the plant if it is to become a functional element in the hand of management. Employees with gastronomical ailments resulting from improper diet are not receptive to education. Employees fearing the conditions under which they work are unable to exercise intelligently their functional skills regardless of the training given them.

Furthermore, it is not inconceivable that the time is here for us to determine through job training, environment, and other extraneous influences where and under what conditions an employee should work. In this general connection, an important visual educational medium developed in our company during the past year dealt with the subject of diet as it affects the possibilities of heat sickness. During the next few years, and just as rapidly as we can correlate the various factors, we visualize a marked expansion of this educational film medium in other fields.

We believe it is a correct assumption that the next few years will reveal less emphasis on statistical data and greater stress on the application of statistical data to the cause of accidents. In this connection, may I plead guilty for industry generally to the indictment that we have possibly over-emphasized the importance of plant or departmental standings as to accident frequency or severity rate with the result that supervisors have built their training efforts around "Look at the Record" rather than "Look at the Method of Doing the Job."

Perhaps we should also enter a plea of guilty to over-emphasis on hospital facilities and staff with inadequate consideration of the real responsibility of plant medical officers. We do not believe it is a falacious prophecy to state that medical officers in the future will hold as one of their chief functions the assistance of operating supervision in safety education. Significant progress has been made in physical examination procedures. Today, plant physicians are utilizing tests for depth perception before employees are assigned to such positions as craneman, truck driver, or tractor operator. Auditory acuity is investigated for use as additional placement criteria. Employees are informed of precautionary measures to be followed in preventing lost time due to "The Common Cold." These and many similar practices are making safety education effective.

Enforcement of safety, while it has been given closer attention and has been applied in varying degrees for many years, in fact as long as the safety movement has existed, is perhaps the most difficult concept to convey. In all levels of supervision there has been evidence of misunderstanding regarding the purpose of safety enforcement.

Employees accept willingly the responsibility established by management in maintaining quality standards. They are fully cognizant of the importance of meeting production bogeys or quotas. They do not question, to any appreciable extent, plant conduct rules. But, in the field of safety, for some reason that defies explanation, they resent generally not only disciplinary action but even criticism. It may be that the difficulty arises from the fact, as I have just stated, that when criticism is administered in some instances it may have been given in a sarcastic manner, whereas it should be applied constructively, and only in that manner, if the proper results are to be obtained. This actually falls within the field of educational psychology. Frankly, this is a case where those who are responsible for training, need training the most.

The employee who places his hands between a set of shear knives in violation of instructions cannot be forced to wear a "dunce cap and stand in the corner." If the disciplinary action results in loss of working time or privileges affecting either the pay envelope or his status, he usually harbors resentment toward his supervisor or the company, unless impressed with the necessity for the discipline by proper education. The task, then, of enforcement is one that, in our opinion, is not connected with discipline, but rather with guidance. We are not inferring that all disciplinary action should be dispensed with, but we should adopt the attitude that violation of instruction is usually the result of faulty management or inadequate instruction.

The adoption of this philosophy will go much farther toward imbuing supervision with the concept that safety is their responsibility than any comparison of "standing" between foremen as regards the number of accidents occurring in their respective areas. To those who may question the advisability of such an approach, we should refresh our memories regarding our own supervisory experiences when safety instructions were ignored. If we do so with fairness and critical appraisal, little doubt will remain as to the logic of such concepts.

Several years ago it was popular to discus "accident prones," and many felt that at last we had the solution to the problem. It was a simple matter. All we had to do was to conduct an adequate investigation, reassign the "accident prone individuals" to some position where the hazards were minimized. Lock them up in a room by themselves—or separate them from the payroll. But, alas, we always found a new flock of "prones."

May we suggest that in 1941 we consider as our most important responsibility the elimination of "poor instructor prones" and accomplish this elimination by taking time off to reconsider the cause of the violation and its effect on the employee by ceasing to discuss safety records and starting to analyze jobs; by terminating our quest for a magic formula and starting to use effectively the tools already available at our command.

Presentation of National Safety Council Awards in the Metals Section Safety Contest

By COL. JOHN STILWELL

President, National Safety Council, Inc.

Col. Stilwell summarized briefly the outstanding facts of the contest. Participation by member units exceeded the enrollment in the previous contest, 328 plants, employing 678,655 employees, working a total of 1,357,373,690 man-hours.

Average frequency rate was 6.94, steel mills having the lowest average, of 4.79. In Group A, consisting of the largest plants in each division, rates were sharply lower than in the smaller plants.

Twenty out of the 328 participating plants went through the contest period without a reportable injury.

Trophies, consisting of handsome Bronze Plaques, suitably engraved, were presented to winners of first place in the contest; and Certificates of Merit were awarded to winners of second and third place. Awards were made as follows:

Trophy Winners

DIVISION I (STEEL MILLS)

Group A.

Bethlehem Steel Company, Bethlehem Plant. 39,683,231 man-hours with 79 reportable injuries.

Group B.

Republic Steel Corporation, South Chicago Works. 4,358,405 man-hours with 6 reportable injuries.

Group C.

Carnegie-Illinois Steel Corporation, Joliet Works. 979,866 man-hours with no reportable injuries.

DIVISION II (ROLLING, FINISHING AND FABRICATING)

Group A.

The J. G. Brill Company, Philadelphia, Pa. 3,472,014 man-hours with 4 reportable injuries.

Group B.

Bethlehem Steel Company, Fabricated Steel Constr., Chicago Works. 822,121 man-hours with no reportable injuries.

Elyria Works, Steel and Tube Division, Republic Steel Corporation. 754,080 man-hours with no reportable injuries.

Beaver Falls Plant, Union Drawn Steel Div., Republic Steel Corporation. 486,526 man-hours with no reportable injuries.

Los Angeles Works, Truscon Steel Co., Republic Steel Corporation. 255,240 man-hours with no reportable injuries.

General Cable Corporation, Los Angeles, California. 229,241 man-hours with no reportable injuries.

Hamilton Plant, Union Drawn Steel Division, Republic Steel Corporation. 158,945 man-hours with no reportable injuries.

DIVISION III (FOUNDRIES)

Group A.

Haynes Stellite Company, Kokomo, Indiana. 804,457 man-hours with no reportable injuries.

James B. Clow & Sons, National Division, Birmingham, Alabama. 613,153 man-hours with no reportable injuries.

Swayne Robinson & Co., Richmond, Indiana, 576,657 man-hours with no reportable injuries.

Carnegie-Illinois Steel Corp., Roll and Machine Works, Canton, Ohio. 510,769 man-hours with no reportable injuries.

Group B.

American Radiator & Standard Sanitary Corp., Ypsilanti, Michigan. 224,407 man-hours with no reportable injuries.

DIVISION IV (HEAVY MACHINE SHOPS)

Group A.

United States Rubber Company, Shoe Hardware Div., Waterbury, Conn. 1,284,263 man-hours with no reportable injuries.

Group B.

Link-Belt Company, Caldwell Moore Plant, Chicago, Illinois. 553,047 man-hours with 2 reportable injuries.

DIVISION V (LIGHT MACHINE SHOPS)

Group A.

Boston Gear Works, Inc., North Quincy, Mass. 1,623,909 man-hours with no reportable injuries.

The Perfect Circle Company, Hagerstown, Ind. 1,609,107 man-hours with no reportable injuries.

Group B.

Campbell Metal Window Div., Truscon Steel Co., Republic Steel Corp. 448,699 man-hours with no reportable injuries.

The Perfect Circle Company, Tipton, Indiana. 328,280 man-hours with no reportable injuries.

J. C. Rhodes & Company, New Bedford, Mass. 306,498 man-hours with no reportable injuries.

Kester Solder Company, Chicago, Illinois. 223,042 man-hours with no reportable injuries.

Hygrade Sylvania Corp., Mechanical Department, Emporium, Pa. 158,352 man-hours with no reportable injuries.

Certificate of Merit

DIVISION I (STEEL MILLS)

Group A.

(2.) Carnegie-Illinois Steel Corp., Edgar Thomson Works. 10,314,874 man-hours with 21 disabling injuries.

(3.) Republic Steel Corp., Warren Plant. 11,400,655 man-hours with 27 disabling injuries.

Group B.

(2.) Republic Steel Corp., Gulfsteel District. 8,393,704 man-hours with 22 disabling injuries.

(3.) Republic Steel Corp., Corrigan-McKinney Division. 8,182, 336 man-hours with 30 disabling injuries.

Group C.

(2.) Republic Steel Corp., Thomas Works. 1,379,849 man-hours with 3 disabling injuries.

(3.) The Youngstown Sheet & Tube Company, South Chicago Works. 1,339,107 man-hours with 3 disabling injuries.

DIVISION II (ROLLING, FINISHING AND FABRICATING)

Group A

(2.) Pullman-Standard Car Mfg. Company, Hammond, Ind. 1,906,793 man-hours with 3 disabling injuries.

(3.) Chase Brass & Copper Co., Inc., Cleveland, Ohio. 3,611,695 man-hours with 6 disabling injuries.

DIVISION III (FOUNDRIES)

Group B.

(2.) The American Rolling Mill Co., Central Works Foundry, Middletown, Ohio. 199,954 man-hours with 1 disabling injury.

(3.) The American Rolling Mill Co., 6th Street Foundry, Ashland, Ky. 131,730 man-hours with 1 disabling injury.

DIVISION IV (HEAVY MACHINE SHOPS)

Group A.

(2.) United Shoe Machinery Corp., Beverly, Mass. 6,082,397 man-hours with 3 disabling injuries.

(3.) Whiting Corporation, Harvey, Illinois. 1,876,504 man-hours with 1 disabling injury.

Group B.

(2.) Jarecki Manufacturing Co., Erie, Pa. 791,540 man-hours with 6 reportable injuries.

(3.) The Challenge Machinery Company, Grand Haven, Michigan. 326,503 man-hours with 3 reportable injuries.

DIVISION V (LIGHT MACHINE SHOPS)

Group A.

(3.) Westclox Div. of General Time Instruments Corp., La Salle, Illinois. 6,326,063 man-hours with 1 reportable injury.

TUESDAY AFTERNOON SESSION

October 7, 1941

Presiding: H. S. SIMPSON, Safety & Sanitation Engineer, Caterpillar Tractor Company, Peoria, Ill.

CHAIRMAN SIMPSON: I shall first introduce the speakers on this panel, as follows:

C. A. Sholly, Safety Director, Sibley Machine & Foundry Corporation, South Bend, Ind.

M. W. Dundore, Production Manager, Beloit Iron Works, Beloit, Wis.

J. P. Boaden, Safety Director, the Union Malleable Iron Company, East Moline, Ill.

W. H. White, General Superintendent, Pittsburgh Rolls Division, Blaw-Knox Company, Pittsburgh, Penn.

J. William Fehnel, Chemist of the Industrial Hygiene Laboratory, Metropolitan Life Insurance Company, New York City.

C. J. Brinkworth, Foundry Superintendent, Link Belt Company, Indianapolis, Ind.

As you will note on the program, we have some six questions which are more or less tentative questions. In the case of several of these questions, we shall probably talk around them rather than talk directly on them. The first question is:

"How can you interest a foundryman in safety?"

We have assigned this part of the program to Mr. White.

Foundryman Safety Interest

W. H. WHITE: Being an operating man, my time and efforts have been spent mostly in the technical end of industry. But having had training in the United States Navy years ago, and having gone through the period of the last war, my first lesson was brought home to me when one of the admirals called me into his office one day and said, "White, we need more *thinking* mechanics." In analyzing that statement, we find that what the admiral really meant was that no matter how humble a man's job may be, he must think and perform that task to the best of his thoughts. We are not all created equal in so far as ability is concerned.

So industry, I believe, stands guilty today in not doing a better job of training than it is doing. I want to quote you a concrete case. Our production recently, like everybody else's, has jumped forward. In our small roller shop, which has something like 30 lathes, our CIO contract requests us to promote men from the labor gang to the machine. A year ago we used to put these boys in and then let the immediate foreman do the training. This year, however, through the Personnel Association of Pittsburgh, I learned something about that. They advocate putting one man, who is relieved of all production responsibilities, to take over this training responsibility.

It worked like a charm. In two weeks, by assigning a man who was truly adapted to the work and relieving him of his own work and responsibility for production, he turned out 15 men for us who were able to operate these machines efficiently. The foreman went along with his usual duties—kept his record reports up—supervised the shop—and I could see the vast difference.

Now, a foundryman can be interested in safety. At breakfast this morning I asked Mr. Simpson whether he meant the supervisor or the employee when asking this question. Of course, he takes for granted the fact that the supervisor is interested in safety, as he should be. So we begin with the employee. There are many methods which you can use to interest him. I wonder if it is really too much trouble for the general superintendent of a plant—even of one that employs as many as 3,000 men—to take about thirty seconds' time to shake hands with a new employee and say to him, "We hope you will be happy with us, and please be safe for your own benefit as well as that of your family"? I do that. I think I would do that even if we had 5,000 employees. We have used psychology in our contract with the CIO; at least two members of the CIO are on the Safety Committee, our idea there being to make them safety conscious.

I don't know of any other way to interest

the man—the foundryman—in safety other than to have the man highest up in the company, the one who is most respected, together with the safety engineer, who is supposed to do that as a duty, wish him well, and tell him that he is expected to be careful in obeying safety regulations.

The thought I am trying to bring out is this: I don't care whether you work for a little company or a big one, I have come to the conclusion that you should stand foursquare to the wind, raise your head, and go right into the front office on an equal footing with any man in any mill anywhere. You are very valuable today and becoming more and more so as time goes on. It is our task to teach the higher-ups that they must take a little time to listen to the safey engineer; to let them know that they are not only dealing with dollars but that they are dealing with human lives.

The way to interest a foundryman in safety is to live it—think it—and talk it yourself; and to have the president of the company come up to him, when he starts to work, and say, "I welcome you to this company, and I hope you will be a safe and satisfied employee."

CHAIRMAN SIMPSON: Mr. White has come pretty close to the crux of the situation. If you do what Mr. White has suggested even once, things are going to be pretty well in your favor as you go along.

CHARLES T. LINDSEY (Carnegie-Illinois Steel Corp., Gary, Ind.): Mr. White stated that he thought a safety inspector or engineer would feel the responsibilities more keenly than even the general management of the plant. I would like to have him explain that.

MR. WHITE: I know that if you are a manager of a plant and a fatal accident occurs in your plant, you don't like it; I know that you feel bad about it; but you get over it in time. The safety engineer feels just as bad about it; but when he is making a summary of plant experience, the thing flares back at him and hits him in the face more definitely than it does the manager. It is always before him. It remains with him longer than it does with the management.

MR. LINDSEY: You say that it would reflect more upon the safety engineer than upon the management?

MR. WHITE: I didn't mean that. There is no reflection on him—not at all—but I think that he is the man who feels the brunt of the thing more than the management.

W. E. LEAVITT (Cincinnati Milling Machine Co.): We have inaugurated a system of meeting all new employees and giving them a safety talk for a matter of perhaps half an hour before they are ever permitted in our shops. We have found that extremely valuable, not only in making a new contact with the men but in getting them started off right.

W. R. TOTHILL (Grand Rapids, Michigan): Our foundry is one of several departments. We feel that while it is very necessary to introduce a man properly, our accident record shows that most of the accidents happen to the older employees. I believe it is true of foundrymen, as of other workers, that the best work in safety is done when a man can be taken away temporarily from his active duties—either during working hours, if that is best, or after the work shift changes—and taught something about safety.

CHAIRMAN SIMPSON: I don't think there is any arguing that point. Look at it this way: we hire engineers to study which machines we should purchase; and then sometimes just reach in, almost as though it were a kind of grab-bag affair, with our eyes shut, and put men on those machines and expect the two to balance. A lot of us have learned the hard way. If we steered men correctly along the way, why it would save all of us a lot of trouble, if not fingers.

We will pass on to the next question. "When is a Foundry Safe from a Health Standpoint? What is Safe Atmosphere?" I will ask Mr. Fehnel to answer that.

Safe Foundry Atmosphere

J. W. FEHNEL: Perfection in the study and correction of industrial health hazards is most difficult because the processes are mostly changing; and new substances are being used, producing more problems to study.

I cannot help but reflect back to 1931 when I made an extensive foundry study in the Milwauke district. At that time, when it was proposed to put in, for instance a program of housecleaning, the idea was considered ridiculous. Castings had to be found every-

where in a dirty shop. When you told them about putting in a permanent type of flooring, it just couldn't be done because the hot metal would splash around and would do damage to anything but a dirt floor. When you suggested cleaning off the accumulated dust on the rafters and pipelines, they simply laughed at you and that's about as far as you got.

All foundries faced the silicosis scare—and it was a scare—we got panicky. After completing a comprehensive study, sponsored by the Manufacturers Association of Milwaukee, which included not only the study of the pollution but also physical examinations and x-rays on the older employees, what were the findings? Ten per cent of the older employees showed that they had fibrosis, but not to any serious degree. That made us feel a little better. But in the meantime some of us took the attitude that, "Well, it's better to let a sleeping dog lie. We are not going to x-ray the younger men."

The legal aspect of silicosis was far greater than the true health hazard, and it still is today. First of all, in a hand-operated foundry it is less prone to be an extensive hazard than in a mechanically operated foundry. However, in the program that is speeding up increased production, we have very few small hand-operated foundries. Today, if you will make a study of your foundry, you can do a lot as a first step; which is the adoption and practice of a good housecleaning program. Use a broom and use it diligently and often. Get rid of that pile of accumulated old glass and old core sand and what not that so often seems to be found in the middle of a foundry.

Then pick out your dust-producing operations, one at a time, and eliminate them. That can be done by proper study and proper application of methods. It is not always a case of putting in an elaborate exhaust system which is expensive to install. Often the application of good common sense will cure the offending dust-producing operation.

However, there are a lot of other hazards associated with foundry operation which are far more serious than the silicosis hazard. Recently I had occasion to study a foundry that had been operating under a process of adding lead shot to the ladle before casting. After about 14 months, they had two definite cases of hospitalized lead poisoning.

Now in this method of the addition of lead shot to the ladle, at least 90 per cent of the lead was vaporized immediately, polluting not only the immediate area around the cubicle but apparently throughout the whole foundry area; and we found a lead concentration during this pouring operation which was far too great for a continuous exposure.

Of course, the use of various metals added to the ladle today is a common practice. I would also like to warn you against the use of saline, which produces extensive kidney damage and is to be avoided. At least, any of these substances that produce incapacitation or illness should be used in such a way that the fume or vapor does not get into the general foundry atmosphere. Some people might think that it is impossible to add lead to the ladle without dispersion of vapor into the air; but it can be done under a hood.

In the steel industry, for instance, one process, producing tremendous gas bubbles, is to add carbon tetrachloride to the mold at the time of pouring. Carbon tetrachloride under those conditions breaks down and liberates or generates a type of chlorine. I saw one installation where there was an exhaust right under the platform, which was very effective in removing those fumes.

We come now to the question, "What is a safe atmosphere in a foundry?" Well, I would like to tell you just what is safe; but I really don't know. I have seen foundries with dust concentrations extremely high which had no silica content. When I say high, I mean that it was somewhere between 80 to 100 per cent. Theoretically, that is a safe atmosphere, although free silica content is way below 25 per cent. But I would say this: I would attempt to eliminate the dispersion of any substance or any dust or fumes or gas into the general atmosphere that is harmful to the men, in order that they may not develop industrial incapacitation or illness.

CHAIRMAN SIMPSON: Any questions?

QUESTION: I would like to ask the gentleman what he would suggest as a precaution against asphyxiation in the case of molders who use salamanders during the winter months—open salamanders? My company has experienced several cases where artificial respiration has had to be employed. Yet these salamanders are necessary in a

big pouring room. We have had one lost-time accident due to a man being overcome by carbon monoxide or some other gas. I don't believe that a salamander will do that, but the man was carried out unconscious.

MR. FEHNEL: If you have a deep bed of coal on top of that fire, you are getting carbon monoxide, so don't kid yourself into thinking you are not. On the other hand, if you have a clear bed of coal there, then the amount of carbon monoxide gas is practically negligible.

I would say that you need a more modern type of heating apparatus, and I would suggest some type of forced heat—steam heat. If you have to use salamanders, then by all means put in a stackpipe which will carry the fumes to the outside atmosphere.

It is common to find carbon monoxide in foundries and steel mills where they use gasoline propelled tractors, but the exposure is slight to the men working in the plant, as it practically runs through the runways or airways. However, the exposure in the dry room when the tractor is used is generally pretty severe. The real trouble arises when a man has to leave the tractor for a while to do something else, backs it up at some point, leaves the engine running.

In such instances I would suggest substitution of electric trucks wherever possible in place of the gasoline propelled motors. They are not as economical and I know that it isn't always possible to do this. But be careful when you do operate such a tractor. It is easier to crank a tractor than it is to revive a man after he is once overcome by carbon monoxide gas.

QUESTION: In our Gary works we put a ring around the salamander three feet away from it to prevent the men from getting too close to it. If he will try something like that, he will obtain satisfactory results.

MR. FEHNEL: I would like to ask the gentleman what he does about his crane operation?

SAME QUESTIONER: The salamander is not under the crane, so that has no effect on our crane operation whatsoever.

MR. FEHNEL: I have taken the test on cranes in the steel mills and found that there is a high concentration of carbon monoxide through continuous exposure, especially during the winter months. In the summer months it is not so bad. The crane operator is the one who gets the least consideration. For instance, you will find that the crane operator will be exposed to fumes far more than the fellow who is engaged in the galvanizing operation. In a number of industries they have gone so far as to air-condition the crane cabs, not with the idea of cooling them, but in order to furnish a supply of clean, filtered air.

MR. McKESSON (Great Lakes Foundry, Detroit, Michigan): Talking about salamanders, the law in Michigan states that the stack must be four to five feet high and that it must be covered, which we are doing and which we find very satisfactory.

MR. FEHNEL: I have made a lot of tests in steel mills where they use salamanders, and I believe that the day is coming when we will discontinue their use. Experience has shown that there is a large amount of carbon monoxide generated under certain conditions. That gas can travel along and will contaminate the air inside the surrounding areas; so that a distance of three feet really wouldn't make much difference. Where heat is necessary, then some other form of heat, if it can possibly be used. It may be all right to use a salamander provided there is some kind of proper ventilation. If you can't give it the proper ventilation, then don't use it.

QUESTION: I would like to ask about ventilation for one of these complete molding units where the entire process is carried on by means of a conveyor system. On the units in our plant, Allis-Chalmers of Milwaukee, it is almost impossible to put any kind of ventilation except an open fan; and in many places along the conveyor lines we can't even use those.

We have the men wearing respirators, but that is one of those problems with which we are faced today. This is a large unit, approximately 70 feet long and 40 feet wide, with a continuous conveyor all the way around—is there any type of ventilation that can be used on that sort of unit?

CHAIRMAN SIMPSON: We have a service return type of conveyor, but not under the floor. Of course, molds are set on one part and poured on the end, and we turn it through a sheet iron tunnel, which is kept

at a minus pressure, which dissipates the heat, and the fumes are exhausted out of the building. That tunnel runs the length of the conveyor from the pouring station to the shakeout; and at the shakeout some of our units have the automatic tripoff; the shakeout and everything else is completely housed. Some of the shakeouts have the cross-flow type of ventilation; that is, up high to one side from the point where the work is being carried on; there is a heavy draft of fresh air across the breathing zone and it is evacuated on the opposite side.

SAME QUESTIONER: Ours works on the same system, but you are bound to get a lot of dust in that shakeout and also from your mixers. Our mixers are right in the center of the unit and not above it. Also, on that type of unit it is necessary to use a metal mold. After all, you are going to spray your mold with something; and you have the vapors that arise from whatever spray you are using. What do you do about your spray men there and the men working on the molds around them?

CHAIRMAN SIMPSON: The overall atmosphere is being churned around quite a good deal by a central system. We have extremely high roofs in the building, and we do use a lot of coal to heat that building, and we use a lot of energy to ventilate it. But, by George, we are ventilating it. Bill really likes to visit it. Will you finish that story, Bill?

MR. FEHNEL: Well, line casting is a common practice in a lot of large foundries. One of the first that I ever saw controlled, was that of the Buick foundry in '31 and '32; and it was being effectively controlled by means of tunnels and exhaust shakeout drafts. Several methods have been experimented with and used at different times. If all these things fail, however, you know the solution: the thing to do is to apply good general ventilation. In other words, when an atmosphere has a harmful effect, you can make it safe by an increased dilution; you can bring it down to a safe concentration. That may be necessary in many cases where an excessive supply of fresh air is introduced at the floor level and creates an updraft. It also may be necessary in some installations to have a combination of exhaust and forced drafts; that is, the area at which you are exhausting may be too wide to pull across effectively, and so you blow it in from the other side and blow the dust to the exhausted side. We have done that very effectively in some shakeout operations.

MEMBERS (Birmingham, Alabama): In the Southwest we use a steel frame building, usually with a sheet iron siding, if any, for it is rather open at times. Can you tell us whether there is a hazard there as compared with the brick building that you use in this section of the country?

MR. FEHNEL: I'm glad you brought that up. I have had some experience in gas with the Republic Steel. Incidentally, that steel mill in general is free of health hazards from dust and fumes due to the construction of the building and the natural atmospheric conditions. I made a few notes on some of my work. Here is one on a foundry in Los Angeles. This was made in 1936. It is too good to believe. The general air in the foundry averaged .8 million; and the squeezer molding, which was the highest count, was 8.8 million; but in the machine shop we had 40 million at the milling operation.

The construction of a building with open sides would be a type that would have good, natural chamber-effect ventilation. However, a machine shop is a typical factory brick building, totally enclosed and with steel-sash windows. So we have a far more hazardous condition, so far as the concentration of dust in a machine shop is concerned, than we do in a foundry.

RICHARD M. BAKER (Baltimore, Md.): We have been trying to use incinerators. We have about 350 trucks working in Baltimore which carry all sorts of trash and rubbish, including powders and paints and undertakers' powder of some sort; but unfortunately we haven't been able to do very much with the ventilation of our incinerators. We have one large pit where a crane goes down into the pit, picks up a load of this stuff, and lifts it onto the conveyor after the trucks drop the trash into the pit. Of course, we get a lot of dust. I wonder if you could tell us about some chemical which we might use that would be helpful in this regard?

MR. FEHNEL: I do not know of anything that you could apply to the operation you have described, except possibly to use water. If it is an intermedial operation, then maybe you can give these men a certain type

of respirator. If it is a constant operation, then you may have to apply some sort of exhaust method.

Respirator Problems

CHAIRMAN SIMPSON: Our next speaker, Mr. Brinkworth, is going to answer the question: "How can you get a Workman to Wear a Respirator All Day in Hot Weather when he is Perspiring and has Difficulty Breathing?"

C. J. BRINKWORTH: Of all the protective equipment available for foundry workers, the respirator, largely because of discomfort to the wearer, particularly in hot weather, is probably the most difficult to sell to employees. The chief reason, other than the factor of discomfort, is that we have done very little in a tangible way to demonstrate to the worker the need, for such protection.

In many cases we have had experience in the use of protective masks by our employees. But in the use of this particular type of mask it should be remembered that while irritation of the respiratory passages is reduced, it is only partially efficient, so that as it is only partially efficient, so that as far as silica dust is concerned, it does not serve as a 100 per cent type of protection.

With the scarcity of labor today, all of which makes for a more independent attitude on the part of our employees, our problem of selling use of an approved type of respirator is going to be far more serious than it was five years or so ago. Until something as effective but far more comfortable than a respirator is designed, our efforts will have to be devoted more than ever before to the task of selling this type of protection to employees and to the job of selling our supervisory staffs on the need of far better housekeeping ventilation and exhausting of dangerous dust.

MEMBER: We have found that where there are enough respirators in use, the care and servicing is an important factor. A man won't wear a respirator today if it is allowed to become dirty and in a messy condition. Where there are a large number of respirators being used, a centrally located service station is a valuable asset. At this station the respirators could be cleaned and serviced, if necessary, sterilized, and spare parts kept at all times, so that when a respirator became out of order, it could be properly put back in shape again.

In some places they use a system whereby each respirator is kept in a paper bag and when a man reports for duty, he can specify which respirator is his.

C. J. BRINKWORTH (Link Belt Co., Indianapolis, Ind.): Do your employees wear respirators all the time?

SAME MEMBER: We have some cases where they do, but we are not proud of the fact that they have to do so. The day is coming when those conditions will be eliminated and when men will be working in more comfortable and safer conditions.

JAMES NEWKIRK (Allis-Chalmers Company, Milwaukee, Wisconsin): We have covered this question of keeping the respirators clean quite well. Every respirator is returned to the department from which it was originally issued. Every eight hours it is sterilized, washed in hot water and placed in an oven warm enough to dry it thoroughly without hurting any of the rubber parts.

But we still have a lot of difficulty, especially in hot weather, in getting the men to wear them. However, by the use of these cotton facelets which the various respirator companies put out, it is a great relief to the men when wearing their respirators over it. Whereas the dust as a rule, especially in foundries, will stick to a man's face and the rubber will irritate it, these cotton facelets or pads will absorb a certain amount of the sweat and dirt.

MR. BRINKWORTH: Do you mean the band around the forehead?

MR. NEWKIRK: No, you are thinking of the sweat pad.

MR. DUNDORE: In Beloit we have quite a few employees who have hay fever and they wear respirators from five o'clock in the morning until the evening all summer long without any complaints at all.

MR. BRINKWORTH: That is a very good thing to hear. Are they forced to wear those in anyway?

MR. DUNMORE: No, they just do it for their own comfort.

MR. WHEELER (Niagara Falls Metallurgical Company): We have a lot of men

wearing respirators at our plant. They are quite fussy about having their own respirators. We bought some large cans—somewhat larger in size than a one-pound coffee can—nicely enameled, and printed the names of the employees on them. By placing their respirator in this can, it becomes a personal affair and that goes a long way with them. These cans are picked up every night and taken to the service department, where they are serviced. The men realize that, because of the work they do, it is really essential that they wear these respirators; and we do have men who wear them eight hours a day.

MR. BRINKWORTH: Do they wear them full time, summer and winter?

MR. WHEELER: Yes.

MR. CRANE (Erie, Pennsylvania): For a number of years we have been having trouble getting our men to wear respirators. We found that by trying different kinds of respirators to fit the job instead of trying to use one particular kind for the whole plant, we could get the men to wear them. We use a type that is not very heavy and yet approved by the Bureau of Mines, and we also use the sweat pads with them. The sweat pad over the head collects the moisture and dirt which streams down the worker's face.

MR. DUNDORE: We try to fit the respirator so that it will enhance the physique of the man who has to use it. Years ago I had a lesson taught me by a negro workman, to whom we gave a respirator to wear. He complained that it made a Ubangi negro out of him, for which reason he wouldn't wear it in spite of anything we could do. So we shopped around, got something that enhanced his physique, and he was then proud to wear it.

MR. BRINKWORTH: In other words, use psychology.

MR. FEHNEL: A respirator should not be applied as a cure-all. In a lot of industries the first solution to a dust problem is to put a respirator on a man; they think that after they have purchased a respirator, their concern ends.

Mention has been made here about personal respirators. One of the larger manufacturers has a system like this. A man comes to work in the morning and receives a personal respirator which has been serviced during the night. He likewise receives a new fiber pad, clean and sterilized, and the whole thing is handed to him in a closed container. He uses this during the morning shift. At lunch time he turns that in and after lunch receives another clean one. In other words, he uses two respirators which have been serviced at night, wearing each one four hours. Therein lies an important consideration: the proper service on these things and the proper maintenance. Another big factor, although somewhat expensive and perhaps inconvenient at times, is that of having several types of respirators on hand and letting the man select the type which he likes best.

CHAIRMAN SIMPSON: In summing up this respirator problem, first of all, a very careful survey should be made of the foundry. First find out what the problem is; not just one grab sample; but study it for a week or so and get some definite idea as to what it is; then decide what you are going to do. Are you going to ventilate the place, or will you have the men use respirators? If you have the men wear respirators, then you must keep on selling them with the idea of the importance of wearing them by keeping them in individual containers and washing them and so forth.

Well, we will next hear from Mr. Sholly, who is going to tell us something about the types of goggles that he has used.

Types of Goggles

C. A. SHOLLY: I shall, of course, only give you a statement of our own experience in the Sibley foundries. Our foundry is a small one. The men in our shop do not wear goggles to the extent of 100 per cent. It is not necessary in all of our operations. However, wherever goggles are used, one thing is certain: they have hard lenses. We use only one type of lens—the very best obtainable—and the reasons for that are obvious.

Getting our men to wear goggles came pretty easy after we had a sad experience in our plant. One of our men lost both of his eyes. After that happened, the management decided to change its tactics. Instead of saying, "We will try to get the men to wear goggles," they said, "We will try to educate them so that they will see the necessity of wearing goggles." Although at one time we had difficulty in getting the men to wear

goggles in many instances, today our goggle problem is practically whipped.

Our experience has shown us that you can't use just one type of goggle throughout the entire shop. Starting with the cube-tipped goggle, which is well ventilated, we used a medium colored green lens. This same lens is used elsewhere and we found that it was quite satisfactory. However, we departed a little from that recently in one of our hot places where we have three cupolas, so that a man is troubled by perspiration; we permit him to use a face shield with a monel screen, and he is getting along nicely.

Our ladle men are supplied with spectacle type goggles, with insulated nose piece and sight shield. They also use a medium green lens. We find that that is the safest, because when a man looks over the ladle and then looks about him, he doesn't have that glare of the ladle and he can get along much better.

In the case of our molders, we have several problems. We gave them just an open spectacle type of goggle, and we had our old-timer problem there also. But following an eye injury to a molder, it became necessary for all of them to wear goggles. We gave all of them a pair of goggles to wear, and then we issued instructions to the effect that if any molder didn't wear his goggles while working, he should not be given any iron.

We started out with the spectacle type of goggle until we found that sometimes molders would get splash backs. Burning particles would strike the back side of the lens and rebound in the eye. Such a man was in line, of course, for another type of goggles almost invariably. So we are encouraging wherever we can the wearing of a ventilated cup-type goggle or the goggle with the screen. The spectacle goggles are turned in, having become obsolete, and they are replaced with these side-screen goggles, and we find that these are giving excellent results.

With regard to the lens, the older men claim that they cannot judge the heat if they have colored lenses. Therefore we give them a clear lens. Among our men we find that many of them prefer medium-shaped lenses. We are permitting some of our molders who wear the spectacle type of lens to use a cover lens, although others prefer to use the monel screen.

In our shakeouts, this same screen disk was the happy solution to a great problem. We have some floors which contain a large number of molds, and the molds are quite large, and there is an excessive amount of heat and steam rising from those molds; and the perspiration falling on the lens was a constant hazard. Our solution was in finding these monel screens, which we put into cup-type goggles. However, all the men do not have to use this type of goggle, as long as they wear some sort of goggles while they are working.

Last summer during the heat we were faced with a problem. Some of our men who were not wearing goggles continuously were approached by their foremen in a sort of rough way and he insisted that they wear goggles. Consequently, they went to a certain committee, and that committee came back and said that our men didn't have to wear goggles. As a substitute for the goggles, therefore, we thought we would try face shields, using a monel screen, and the men who objected to wearing the goggles are now using those.

In the case of the chippers, we have never had any trouble with goggles. We thought we had that problem whipped by a deep-cut type goggle, but then we introduced the high grinders and we found we had to fit the thing over again.

We also are confronted with this persiration problem. We have found that we can secure an extension ring which sets the lenses a little further from the eye. When we do this, we have less trouble, of course. It cuts down the range of vision a little bit, but nevertheless I think the additional safety is there because they do not have a steaming goggle.

Our cover-type goggles, of course, are worn in all cases by men who have had corrective lenses made. I really don't see, just considering this matter from our past experience during the last few years, how the goggle situation, if attacked properly, should turn out to be a very hard problem.

B. S. CORNWALL (Insurers Service Corp., St. Lous, Missouri): Our aluminum workers work in front of a small oven. They take their ladle of aluminum, turn around while in front of the oven, lean over, and pour it into a die. They are right over that heat all the time. Our experience has

been that when they wear goggles, their face around the eye becomes tender, and they are rebelling against wearing goggles, especially of the closed type. I wonder if anybody has had any experience with close work of that sort?

MR DUNDORE: On all hot metal work in our plant we insist that they wear, and we provide the men with, asbestos lined goggles, which does away with the transferring of the heat, and these have a bakelite molded frame. I believe you will find that these are on the market commercially, and you will get a lot of satisfaction from that type of a goggle in preference to any other kind of a frame—a metal frame particularly.

CHAIRMAN SIMPSON: While Mr. Dundore is on his feet, I would like to ask him this question: "When does safety education stop or start?"

Safety Education

MR. DUNDORE: When does safety education stop? I can sum it up in one word: when the operator is dead!

I think it would be well if you reported to all employees that the country today is largely concerned with this subject of eyesight; that once you have an eye injury or lose an eye, nothing can be done to replace it; and that is one lesson you can get over to your employees.

Safety education, so far as I am concerned, starts with the management and probably ends with the employee. I don't think it should ever end.

I believe that safety education can be carried on very nicely in the average plant by the utilization of safety slogans printed on the back of the time cards, so that as the employees punch their time in and out four times a day, they will be confronted by this slogan as a safety reminder. The cards and the slogans could be (as they are in our plant) changed every week. At the same time that the name is printed on the clock card, this safety slogan could also be put on it.

Every inter-office envelope bears a slogan on the top of it saying, "Safety is everybody's business." Those envelopes are continually passing around throughout our plant. We have 19 different departments, and we have one mail boy making a route every sixty minutes. Those loads of departmental envelopes containing orders, instructions, copies of letters and what not, are always face up on the foreman's desk—always in transit throughout the shop—and whoever opens these envelopes is first confronted with this slogan, "Safety is everybody's business."

I think the management is also lax to a great extent in not fitting goggles individually. I don't know of any two individual's faces which are exactly alike. It's a job. The education must be done. I don't think we are getting our young men young enough as regards this matter of being educated along the line of what to expect in the problem of safety in industry. In Beloit I have been trying to institute a safety program in the schools. I started out with it last year in high school, and I am glad to say that at the present time no youngster matriculates from the Beloit High School unless he has taken up and received credit for a course in first aid.

Also, the manual training departments in the high school are being furnished with goggles, not by the apathetic school board but by my own company, free of charge. Our education in Beloit is starting in the schools and not starting in industry, where I sometimes think it is a little bit too late to begin.

One of the previous speakers said something about talking to an employee about safety after he is hired. We speak to an applicant before he is hired. He can think the matter over that night. If he doesn't like what we prescribe to prevent accidents after he starts to work, he does not have to show up the next day. We would rather not have him. It doesn't cost us a dime at that time, but it costs us a great deal of money after we have hired a man, he has worked with us for a time, and we then find out that he doesn't like the arrangement we have made.

I also believe that a lot of employers throughout the United States miss a good bet by not starting and keeping up a shop paper. I find that you can sell more safety in a shop paper than you can by talking to a thousand employees once a year at an annual meeting on the subject.

I find also that a review of all accidents which occur in the plant once a month, by

having it drawn to the attention of the foreman, who in turn hands it over to the employee involved, is a good safety measure. In other words, talk it over with the employee after the accident has happened and after it has been investigated.

I also believe that it is poor policy to allow men to work in your plant whose eyesight has not been checked or corrected once in at least three years. A good many accidents are due to the fact that men are working with the glasses which they bought in a dime store 20 years ago; or they haven't nerve enough to be examined after 10 years for fear that they will have to wear bifocals. The result is that numerous accidents occur because of bad eyesight.

All these things, I say, can come from the top down. It is a wonderful place to inaugurate a safety program. Any further education is up to the individual themselves. It is up to you to bring these things to a head by pointing out to management some of the things. But above all, don't miss the chance of taking the boys into your confidence. They are entitled to know.

CHAIRMAN SIMPSON: It is getting late, and I would like to run the next two discussions together. Mr. Boaden, is going to discuss just what particular phases he thinks we ought to concentrate on. He heard one of the previous speakers say: The United States Government found that they can make soldiers in about 10 weeks but that it took a darn sight more than a year to make an officer. I think that is true.

MR. BOADEN: All I have to say is this, fellows: that as far as we are concerned, we believe in concentrating on certain things, and this is what we found from our experience: that it pays to concentrate on goggles and glasses and leggings and safety shoes and respirators, as well as on safety bulletins; and we also like to get suggestions from our employees.

WEDNESDAY AFTERNOON SESSION

October 8, 1941

Presiding:—R. H. Ferguson, Manager of Safety, Republic Steel Corporation, Cleveland, O.

Environment—Management's Responsibility

By P. C. KAUFFMAN

Superintendent, Safety and Welfare Department, Jones & Laughlin Steel Corporation

Pittsburgh, Penn.

All will agree that environment plays an important part in our lives. We are motivated by our frame of mind and our surroundings. If a person is in fear of management, his health, or his safety, he is unstable and unhappy, which is a hindrance both to himself and management. Safety engineering includes any and all things that can be done to promote the workers' safety, health, comfort, and well-being.

What can management do to improve environment especially as it pertains to safety? Plant environment can be improved by good housekeeping. As a housewife is judged by the appearance of the home, so is management judged by the appearance of the plant. That which is orderly and well-kept has a definite appeal to all of us. In the same way, we note the unclean, untidy, slipshod business, and seek to avoid it. It is repulsive to our senses and arouses our suspicion as to its management.

By nature, some businesses are clean and others are dirty. This we know and accept, but there is no excuse for poor housekeeping, whether in a kitchen or steel plant. Good men are attracted to companies which clean up and paint up, and strive to keep their plant that way. The safety department can play an important part in helping management maintain high standards.

In order for us to see some of these things which create environment and influence people, let us take an imaginary trip around a steel plant and form our own conclusions.

As we enter the paved driveway, we see directly in front of us a Jumbo Poster Board telling its safety message to every person who passes and our first thought is of safety. Ample provision has been made for foot travel and the clean plainly marked directional signs leave no doubt as to the best route to the different parts of the plant.

Our first stop is at the emergency dressing station. It is conveniently located and the appearance indicates pride and cleanliness. We are greeted by a cheerful nurse who explains the system employed for keeping records and shows us the various rooms used for physical examinations and emergency treatments. We note the modern facilities and have a feeling that should one be injured, here is a place where he would receive the best of aid and treatment.

On our way to visit the first mill we notice men chipping and scarfing steel. The chippers are wearing gloves, goggles, leggings, and safety shoes, and the scarfers, in addition, are wearing fire resisting clothing.

Nearby are men working in railroad cars. They are cautious and do not stand near any lift being placed in or removed from the cars. Instead, they climb out of the cars after chains are properly placed. These men are protected by a derail and blue flag on the track, and we are told that this is a standard practice on all shipping tracks and that no move is made until flag and derail are removed by the foreman of the shipping crew.

Inside the building we see a light indicating that the door is raised to its maximum height to clear a train and bells are ringing so that workmen will know that cars are being moved. Warning signs on columns are displayed where close clearances might mean injury to a member of the train crew.

We are shown an acid car being unloaded. The men performing the job are wearing acid goggles, rubber hats, coats, boots and gloves. It is interesting to note that the acid is pumped and not moved by compressed air.

We watch some barges being loaded with steel and coal barges being unloaded. All the men on the barges are wearing life vests. Other safety equipment, such as row boat, rings and hooks, is in easy access in case of need.

Throughout our trip we observe that the buildings are well maintained; there are no loose sheets and apparently no leaking roofs. We are informed that maintenance crews are constantly at work. Painters work on scaffolds which are supported by the usual block and falls, and in addition, have steel cables fastened securely to the building and scaffold. This is to hold the scaffold from falling in case a defect in the rope might not be detected. They show us a rope testing machine which is used to test all scaffold rope each time it is used. Each man on the scaffold wears a safety line and belt attached to his waist, and fastened to a cable independent of the scaffold support. Some repairmen are working on a plank scaffold nearby. We notice a band of paint on the ends of each piece of lumber and are told this is done to identify scaffold planks which have been properly selected and reserved for such use.

In many places portable ladders are in use, equipped with safety shoes most suitable for the floor surface. Many are lashed at the top to prevent slipping. A man is stationed on the ground to prevent the ladder from being bumped by passing men or vehicles. Signs indicating men working overhead or below ground level are prominently displayed. Excavations are well barricaded and warning lights displayed. Shoring of excavations is strong enough to prevent a cave in of surrounding soil.

Hand tools are examined and are found to be free of mushroomed and spalled heads, or split handles. Cutting edges show frequent and proper dressing.

In the wood shop we are careful to note that all machines have proper guards and dust is removed by an exhaust system.

There is available at every point fire equipment of a varied and suitable nature for the type of fire likely to occur in that vicinity. Fire zones are established in certain areas where smoking is prohibited, non-sparking tools are used, all lights are in vapor proof bulbs and flashlights are a non-explosive type. Fire brigades are part of the operating or mechanical organization in each department and hold monthly drills. Fire equipment is checked daily and recharged when

used, or according to a fixed schedule. All fire hose is tested annually. Each department has is own fire alarm system as well as being included in the general plant system. Cold blast mains at the blast furnaces are protected by both steam and water spray pipes. Oil cellars are protected by steam and foam systems. Paint and other flammable materials are safely stored in fireproof buildings. Flywheel pits are protected against fire with a steam smother system.

We are told that all employees are instructed in first aid. Stretcher boxes, fitted with stretcher, blanket and tourniquet, are of sufficient number and located in such places as to be readily accessible in case of accident. Gas rescue equipment is stored at convenient points, and consists of all service masks, fresh air masks, one-hour rescue masks and inhalators. Carbon monoxide and combustible gas indicators are also on hand and are employed to detect gaseous areas before certain jobs are performed.

Drinking fountains are numerous and accessible. Salt tablet dispensers are attached to or near each drinking fountain. Dispensers of other types of merchandise are scattered throughout the various buildings for the convenience of the workmen. Sanitary buildings are modern, with sufficient facilities for all employees.

Everywhere we go we find that safety has preceded us. Steam engines and air compressors have signs warning men against standing in front of cylinder heads. High tension electrical equipment is protected and well marked with the proper signs. Crane booms carry signs on both sides to warn men about the danger of standing under the boom. Safety cables and wedges are hung at prominent points in departments where piled material might fall and pin a workman.

All emery wheels are equipped with a sign cautioning men to adjust rest, wear their goggles, grind on the face of the stone and not to wear gloves while grinding. As an added safety measure, they are also equipped with safety washers. Each machine is inspected every three months and the speed and physical condition of the machine and wheel are noted on a written report. If defective, it is taken out of service until corrected.

As we pass from one part of the plant to another, we see goggles worn by various groups of workmen. Some wear chippers or cup type; others wear those best suited to their work. We remark about the great amount of fireproof and woolen clothing being worn by men on many jobs and are informed that workmen are required to wear such equipment where in danger of sparks or molten metal. We inquire about the use of safety shoes and are told that practically all workmen and foremen wear safety shoes except in a few occupations where they are not required. Our guide mentions the fact that almost every day an accident to toes is prevented by their use. In addition, hard hats are part of regular equipment on many occupations and save many head injuries. We find men wearing respirators where dusty material makes their use advisable.

We are anxious to find out what precautions are taken when men are repairing machines and are shown a typical example. An open hearth furnace is under repair. Each gang working on the job has its own lock on operating mechanism. This prevents operation until all crews have completed their part of the repairs. In a like manner cranes are locked out and signal lights on crane cabs indicate when cranes are not to be operated or moved.

Throughout our trip oxygen and acetylene equipment is much in evidence, and on checking, we find all regulators are marked for identification and are inspected and repaired at stated intervals. Tanks are well stored in separate compartments. Fire extinguishers are part of regular equipment used by gangs on cutting operations.

Every precaution has been taken to provide the employees with a safe place to work. Ladders and stairs are numerous and provide easy access to cranes and valve platforms. Inspection of chains, cables and slings shows no evidence of defects. Daily inspection by the crews using this type of equipment has reduced this hazard to a minimum.

All material or equipment found to be defective is tagged with a red tag on which is printed "DEFECTIVE—DO NOT USE." No workman will use equipment so marked. As soon as it is repaired, the tag is removed.

Hand hooks are used by crane followers working with cranes and by narrow gauge brakemen when coupling cars using link and

pin couplings. Guards and safety switches on machines are adequate and of proper design.

Safety bulletins, posters and display boards are conspicuous throughout the plant.

Housekeeping is excellent, lighting is adequate and repairs are well maintained. Passageways are clean and open. Material is piled in an orderly fashion. Supplies are kept in convenient places and are well protected. Machinery is clean and in good mechanical condition. Heating and ventilating have been given their proper consideration.

Most notable is the interest and pride shown by both workmen and their supervisors. Their safety record indicates a splendid achievement as a result of careful attention to housekeeping, correction of unsafe practices and conditions and the support of management in obtaining a good working environment.

We leave this plant with the feeling—here is a company that can be proud to have its name advertised to the world, for it is more than just a place to work. Its management is maintaining a good environment for their employees.

What is management? Management is the skilful or prudent use of means to accomplish a purpose—in this case, to create proper environment for safety. Means includes money, methods, machines, materials, and men.

To have a well developed safety program, money must be intelligently spent for physical improvements, safety appliances and a corps of safety engineers and assistants to systematically cover all sections of the plant, and coordinate the safety training, inspection and investigation phases of the safety program into a whole. Management should encourage every effort of the safety department to improve the physical condition of plant properties toward safer working conditions and not hesitate to expend money for material or equipment that might help to reduce accidents. Without money, many phases of the safety program could not be conducted. This is probably the best means management has to show its sincerity in safety to its employees.

One might say all men are part of management, for does not the most lowly laborer manage a part of the company's money, employ some part of the method used to make a profit for his employers and a living for himself. Some machine is used by him or for him. He may cut lumber, roll steel, or shovel sand.

Top management has the responsibility of seeing that all these means are combined into a smooth working whole.

Job Analysis—Its Relation to Safety

By HJALMAR W. JOHNSON

Superintendent of Blast Furnaces, Inland Steel Company, East Chicago, Ind.

Any operation or job can be performed safely. It is no major task for an experienced, intelligent man to survey some work and set up a safe way of doing it. In fact, we have found by experience that the more difficult the task, the more carefully we analyze the job, with the result that on such tasks we rarely meet with any accident.

The serious injuries more frequently result from minor routine operations—tasks we have accepted and about which we do not worry. It is never a problem to analyze accidents after they have occurred and find the cause or causes. There is nothing mysterious about it—yet we have accidents, and frequently they are repetitions.

If a particular job can be analyzed and the safe procedure developed—or, if it is so easy to review an accident and see the causes, why don't we cut out the accidents? Frequently the reason is that we have not related closely enough the information or knowledge derived from our job analyses to our whole safety program. Job analysis is a tool—to be used in performing the job of safety; the task cannot be completed without the tool, nor is the tool of value in performing the job of safety if it is not used.

Some years ago the Pig Machine gang was raising the end door of a drop-end gondola car, preparatory to loading it with pig iron, when the partly raised door slipped and fell

on the foot of one man, breaking several bones in his instep. The usual investigation was held and the usual causes of the accident found—men not working together, misunderstanding of signals, hands slipped, need to be more careful, etc. This operation seemed so simple it was a shame that men would receive serious injury doing it. We delegated one man to study the operation and develop a safe way of doing the work and he reported as follows:

"A wooden block 8 x 8 x 10 inches with a loop handle made of steel and fastened in one end will be provided. On end doors up to 30 inches in height, three men will raise the door sufficiently to slip the block under the door. This should be done so that if the door falls it will come down on the block. After block is in place door is to be lowered on to block, allowing men to get a new hold. Then, with all lifting together, the door will be raised into position. If the door is over 30 inches in height, four men are to be used rather than three.

"With unusually high and heavy end doors, four men may not be sufficient, and such cars must be moved under a crane."

Following this procedure would not insure against all possibility of accident, but it would insure against men dropping a car door on their feet, and this was the only likely source of serious accident in this operation.

These instructions were mimeographed and a copy sent to each foreman. Not long after this we had another car door dropped at the Pig Machine and another broken foot—just exactly as had happened before. Investigation revealed that the men had not followed the procedure which we had developed after analyzing the job. The information was available to prevent this accident from occurring—but something was missing. What was it?

1. We waited until the first accident had occurred before we set up a safe procedure—we were not smart enough to recognize the hazard beforehand.

2. The material when is was accumulated was not properly recorded. Sending loose mimeograph sheets to the average foreman is about as useful as filing in a wastebasket.

3. The information was not used. No system of instruction had been set up so that we knew the proper men had been told.

4. The policing of the organization had failed. It is fair to assume the men had failed to follow instructions many times previously without being observed and reprimanded.

From this experience, one major conclusion can be drawn, namely that job analyses in themselves do not stop accidents. The job, to be effective, must be used as the first step of the safety program. The necessary steps are:

1. Analyzing the job.

2. Recording results of analyses in proper form.

3. Using recorded data in instructing employees.

4. Observing that instructions are carried out.

5. Control of program by Management.

The first step, job analysis, is one that requires much time and effort if it is to be done right. First, every job done by any man in the department or unit being studied must be carefully scrutinized and every hazard noted. Considerable help can be had in this from the following sources:

1. The men who are doing these jobs.

2. Safety rules and safe procedures for certain jobs.

3. Reports of previous accidents.

After all of the hazards have been recorded, it is then necessary to decide the best means for eliminating them or minimizing the possibility of injury from them. In the process of accumulating this job analysis data and deciding what practices should be adopted to prevent injuries, we had a number of experiences which are worth mentioning.

At one time we purchased a motor-driven bandsaw for our carpenters. This was a hazardous piece of equipment with which we had never had any experience. It was very helpful to refer to a bulletin put out by the National Safety Council, giving detailed instructions on how to handle this equipment safely.

At this same time we installed a lot of belt conveyors. We had heard of the serious accidents that had occurred with them, but again had had relatively little experience. On such a standard piece of equipment we felt there should be concise safety rules available, but

in this case our limited search failed to discover any. This suggested that because many jobs are standard, proper rules should be available from a central source.

We frequently found, in comparing rules or instructions on a job or machine, that there was some difference of opinion, as for instance in the handling of oxygen and acetylene. In this field we had had a reasonable amount of experience, but we were not experts, and so hesitated in deciding which instructions were correct.

Another fact became apparent, that job analysis frequently showed that the only safe way of performing certain tasks interfered with operation. Because we were putting these job studies and rules in writing, we were forced to make decisions as to just how far operation should be held up for the sake of safety. For example, we had formerly delegated a man to watch other men who were cleaning tracks while the ore cars shuttled back and forth. This method was only as good as the watchman.

The really safe way was to put skates on the track and stop the car from operating in the area. The fact that no accident had occurred in cleaning the tracks by the former method did not mean that one might not happen, and if it did, the accident would be a serious one. But if the track cleaners were protected by skates they could not possibly be hit by a car. This method, however, would delay the filling of the furnace, and it would be necessary to organize carefully in order to minimize the delay.

Another fact that was revealed by this closed study was that we were frequently trying to make a hazardous condition safe by writing rules or procedures rather than changing the situation or design so as to eliminate the hazard and the need for rules. While preparing this paper I noted such a procedure that had slipped into our Safety Book. A rule states, "Do not bump controller of scale car while bin gates are open." The obvious correction is, "Locate the controller so it cannot be bumped and install one that is self-centering."

Having accumulated this material, we were no further than when we had prepared a job analysis of raising the end door of a car. We needed to organize the material and record it in a form convenient enough to use. Just as a course in algebra centers around the algebra text-book, so the program of safety must center around the safety book. It must be organized so the material can be found quickly and used.

The Blast Furnace Department consists of 12 subdivisions. Many rules or procedures which apply to one group do not apply to another; in fact, rules which apply to one occupation in a group do not apply to another. The information was divided up into:

1. Rules which apply to everyone in the Department.

2. Rules which apply to everyone in a subdivision.

3. Rules which apply to particular occupations.

The obvious advantage of the division is, that a man only learns the rules which apply to him. A dock laborer is told to learn the Dock Labor Rules, the General Dock Rules and the General Department Rules. He can concentrate his effort and will work harder because he knows that these do apply to him. He is not being confused by trying to learn about many strange irrelevant things, like welding, handling chemicals, etc.

Having accumulated the required information from job analysis and recorded it, the next step was to apply it most effectively so it tied into the whole safety program. Since the contact with the individual men is through the foremen, the whole program must be developed through them. They are the ones who must teach the men and they must recognize that that is their responsibility. It is not enough to go through the formality of a safety meeting. They must recognize that there is a job to do, that the time allotted is short and they must teach well. This cannot be done in a poor quarters, where half the men are standing or leaning against the wall, where telephones ring, where others are passing through and boilermakers or switch engines are working outside.

However, the educating of the foremen and the directing of their activity is the problem of those above. The Safety Book which is the text-book is divided into sections and every group safety meeting in the department during one week discusses Section 1, the next week Section 2, etc. At the end of the series four or five weeks are devoted to discussion of their particular group. The

function of the foremen's meeting is to prepare them for their group meeting. This consists of providing additional material, such as descriptions of accidents that have occurred, in order to illustrate the purpose of the rules or procedures under discussion. Changes and additions to rules which have been suggested are discussed and decisions made. It is necessary to realize that the safety program is not static, it changes with ever-changing conditions.

If job analysis information is to be intimately associated with the safety program it is necessary to do more than teach. We must police, so that our instructions are carried out. The information must be used to be effective. There can be no "maybe"—everyone must follow the rules. When the employees recognize that we have made a sincere effort and see that it is to our mutual advantage for them to follow the precepts we have laid down, most of them cooperate very willingly. Those who, because of laziness, forgetfulness or other reasons fail to obey rules must be disciplined. It is the job of supervision to observe these infractions and discipline as needed.

Men will only be safe workmen when they are convinced that safety is a part of their job. It is just as much their duty and responsibility to do a job safely as it is to do it correctly and economically. The fact that a millwright can change a pinion on a hoist motor on a crane is not enough, he must also know that he must lower the load to the ground, block the drum, then pull and lock the main switch.

Finally, the whole must be tied together under one person. Proper record keeping must be set up so that this one man can constantly check whether or not the individual men are getting their instruction, whether the foreman is holding his safety meetings, that new material is provided and being used, that rules are followed, discipline meted out when proper, accident reports intelligently written and correct conclusions made. This man should also get regular reports of special instruction on first-aid and gas helmet training, maintenance of safety equipment and stretcher stations, and the status of safety jobs.

And so I believe job analyses are extremely important as the first step of a safety system. If the analyses are carefully made, and if this material is recorded properly, distributed widely and used systematically, and if the workers are supervised by foremen who have been trained to protect their workers from injury, and if the operation of the entire system is properly controlled and supervised, job analyses will be definitely and intimately related to safety.

Safety Meetings—Group Meetings—Personal Contacts

By H. W. DARR

Safety Supervisor, Kansas State Board of Health, Tokeka Kans.

This subject is divided into three major parts. The first, and what once was the most important, is the safety meeting. I now believe the regular safety meeting ranks about third in importance. In a well-organized industrial plant we should have about three distinctive types of safety meetings: one conducted by the plant manager, one conducted by the department superintendent, and one under the direction of the plant safety engineer.

We have found it advisable to schedule these meetings a year in advance, and then stick to the schedule. If this is not adhered to, postponements soon become a habit, and any alibi becomes common. The first meeting of the month is or should be the one conducted by the safety engineer with his lieutenants, who normally are scattered throughout the plant, one for about each 250 men. Of course, these men have regular producing jobs but of such a nature that they can be relieved at any time for special duties pertaining to safety. These men generally fill supervisory positions. At least, men of influence should be selected.

At this meeting, the accidents of the previous month are discussed, various types of statistical information is dispensed, suggestions for the betterment of the safety program during the current month are received, and in general, it takes the nature of a "pep"

meeting and organization for the month ahead. Each succeeding month thus becomes a distinctive unit in the safety program and with one object in mind, i. e., to make this month better than the preceding one. If this is accomplished, accidents will have been reduced. I must emphasize the fact, however, that this meeting, with all others, requires careful preparation in order to become beneficial to the safety program.

The second type of meeting also should be held very early in the month. This meeting is scheduled on a specific day each month and is conducted by the plant manager, with all his superintendents and their assistants. We should expect to find the safety engineer, the plant engineer, the purchasing agent, the chief accountant, and other similar non-operating heads. Their presence, to give and take advice and make suggestions, is just as vital as that of the superintendent out in the operating field. No safety program can or will be effective unless every man in the organization feels his importance and is willing to become a part of the organization.

This meeting also takes on the nature of a "pep" meeting, and planning generally for the month ahead. Statistics of a broader nature are discussed here. Plans of a more general nature are promulgated. The plant manager has the opportunity to express his interest in safety work and to inoculate his supervisory force with the same "bug." After all, if the plant manager shows little or no interest in the safety of his men, organized safety in any industrial organization is a dead issue.

This meeting also must be carefully planned, and when concluded, the management, the supervisory force, and the safety lieutenants should be ready to tackle the safety problem in a real live manner during the remainder of the month.

The third type of regularly scheduled safety meeting is that one to be planned and conducted by the various division superintendents. If wise, the superintendent will call together his foremen, the safety lieutenants in his division, and other key men who are able to leave their jobs for about an hour. In fact, this meeting should be important enough that, at the appointed time, all participants will assemble without notification.

The proceedings of the safety engineer's meeting, with suitable statistics, the minutes and proceedings of the general manager's meeting, and other matters of a general nature are discussed, so that the entire plant may in part, at least, be thinking about and working along the same line. The remainder of the time of this department safety meeting should be devoted to local problems of such a nature that require the attention of the department superintendent and for the enlightenment of all men in the department. These meetings, also, can be made beneficial with the proper type of preparation, but if conducted in a hit and miss manner, it would be better if they never convened at all.

Now we pass on to the second phase of this topic, the group meeting. I prefer to call this a "job-planning" meeting, for that is altogether what it is, or should be. Unlike the meetings already mentioned, it is impossible to schedule such meetings very far in advance, if at all. The nature of such meetings demands quick thinking and acting on the part of the supervisor, who is the sole guide in the selection of the time, place and character of the meeting. In some instances, where the work is of a variable nature, it becomes necessary to conduct such meetings daily or even oftener, while in other cases—where operations are of a routine nature—a meeting weekly, or even monthly, may suffice.

One fact remains, however, that every workman in any industrial plant should be contacted in a group, or personally, at least once every month on the subject of safety, just as a reminder of his obligations and duties and to keep his interest at the highest pitch.

Much has been written during the past few years on the subject of planning, both for efficiency and safety, and in the final analysis, considering any type of work to be done, it is the only sensible thing to do. Building a house without any previous planning and calculating would be just as sensible as to operate a safety program without any previous planning. To make these planned meetings effective, there are a few factors that must be considered.

First, there must be time and a time for holding the meeting. From much experience we have found that the only logical time is at the beginning of the working turn or at

the start of a new job, and on company time. The nature of the work must necessarily govern the time and times for such conferences.

Second, the place. This, too, must be governed by the nature of the work to be done. If practical, the meeting should be conducted at the site of the job so that the different features may be pointed out and not theorized only. It has been said that eye impressions are twenty times more effective than ear impressions. If this be true, take your men to the job, have as much quiet and comfort as possible, and make it worth while and not only a quick get-together to fulfill a compulsory obligation where your superior has told you that you must conduct group meetings. Such meetings must be short, snappy and full of "pep."

Third, who shall be included in the group? To this, there is but one answer: every man to be affected by the job at hand; or, in other words, every man who is scheduled to have a part in the work to be done. It is necessary, in the safe conduct of any operation, that every man in the crew be familiar at all times with the whereabouts of every other man in the crew or on that job. Too many accidents are caused by someone not knowing that "so-andso" was at a certain place.

Fourth, the leader. This, again, is obvious. Every job has or should have a leader or a foreman, and I have often heard it said that if a foreman cannot lead his men in safety discussion and job planning, and carefully guard them while in the conduct of their duties, he is scarcely fit to lead the men in the conduct of their physical efforts in doing the job. It is my candid opinion that there are too many foremen in industry who are foremen in name only and woefully lacking in qualifications. Yes, a foreman today must be a whole foreman or no foreman at all.

Fifth, what shall we talk about for ten to fifteen minutes? First and most important are the different features of the immediate job. This requires the careful direction of the leader and the suggestions of all men present. The trivial suggestion must receive the same courteous consideration as the most important one. A slow and ignorant workman can be made to feel his importance in any organization or group, and when this is accomplished you will have made a loyal and safe workman. It might be well also to give this group a smattering of plain statistics and show them how they stand in comparison to other similar units, possibly discuss a few accidents that took place somewhere else, or a few general safety suggestions; but, experience has taught us that it is more profitable to plan our own jobs than to utilize this time in discussing what others have done.

Summing up the group meeting policy from actual experiences and where this policy has been strictly adhered to, it has been proved that ten to fifteen per cent more work has been done in a given period of time by previous careful planning than where no planning was done. Furthermore, fewer accidents were invariably noted.

The third and last point in this subject is that of personal contacts. In my experience as a safety director, over a period of twenty-eight years, I have seen some remarkable reformations by the personal contact practice. On the other hand, some of the saddest experiences of my life have come through ineffective personal contacts. I mean that the contacts were made in the name of safety but they failed to register.

There is no better time or place to make an impression on your fellow man than just where you and he are together, providing he believes in you and believes what you say. There is no more satisfaction to be attained in this world than to have someone tell your friends that you gave "so and so" some good advice and he believes you and believes in you. How many people in this world among your acquaintances believe in you and are ready to take your advice? If you speak to deaf ears or hollow heads, you had better not speak at all.

Then, another phase of personal contact work is this. Are we not all prone to be fearful of offending the one whom we are advising or correcting? Are we not all guilty of holding our punches? Is it not true that we would rather close our eyes to an apparent infraction of safety rules than to correct the offender at the first instance?

I recently heard a manager of a large steel plant make the statement that the best safety enthusiast is the meanest man in the world when he sees an offense being committed against safety, providing he has sense enough to apply his meanness in such a manner as

not to create offense of a lasting nature.

Let me illustrate: A machine shop foreman passing through his shop saw Bill chipping a casting, with his goggles around his neck. He looked and remained silent for fear of offending a good friend and a good workman. A few minutes later he noted the same man under the same conditions. After the foreman passed by the third time, Bill received a chip in his eye and was sent to the hospital, where the eye was removed. Two days later the foreman visited Bill and heard him say: "Boss, why in the name of God didn't you send me home for a week when you saw me the first time? I'd have lost a little money but I would still have my two eyes." The foreman sat down and cried.

Just recently a brakeman lost an arm by hooking it over a coupler of a car to properly adjust it when a coupling was to be made. His conductor admitted after the accident that he had seen him do the same thing before but did not want to hurt his feelings by bawling him out. But was a bawling out necessary? Is it possible to correct a fault in a courteous manner and have the offender like you better for it? It certainly is possible and practical, but I am sorry to say that it is not common practice.

However, it must become common practice if we expect to advance much further in the prevention of unnecessary accidents. Was this foreman a real friend of his machinist, or was the conductor a real friend of his brakeman? From the only common sense viewpoint, no! A real friend will make you suffer, if necessary, providing the act eventually works to your own good.

So, in summarizing this entire discourse I am compelled to state that personal contacts, with the proper approach and in the right spirit, are the most effective weapons in the safety field today, but the hardest to handle. We must approach this method of stamping out accidents, even if severe discipline must be resorted to after friendly advice has failed, but don't wait too long to bring the offender to his senses—it may be too late.

Since 90 per cent of all accidents are the result of human failures rather than mechanical failures, safety meetings, group meetings, and personal contacts should receive the same ratio of attention, with special emphasis on personal contacts.

Enforcement—Control Measures, Safety Instructions and Regulations

By RUSSELL I. PISLE

Superintendent, Industrial Relations, Republic Steel Corporation, Chicago

It is well known that the foreman and supervisors are the real backbone of a successful safety program. When safety is considered as an operating problem, then the foreman who is responsible for production is also held responsible for the safety of the men under him.

Thus we find that it is not the safety department, as such, which enforces the safety rules and regulations. It is the foreman who, within his own working force, must see to it that the men work safely; and if they will not work safely, then that they are disciplined. The safety department takes nothing from the old authority of the foreman or supervisor to discipline a man for poor workmanship, not even when that man is a poor worker because he will not work safely. The foreman is the closest member of management to the worker, and it is on his judgment we depend for the enforcement of safety.

There is only one occasion when higher management steps in over the foreman to enforce safety and that is when the foreman has failed to do his part in enforcement among his men and the Accident Investigation Committee, upon proper study, will determine what discipline will be assigned because of lost time or near lost time accidents. And then very often, it is the foreman who is disciplined and shown how to enforce safety.

This brings us to the second part of my subject, that of control measures. Our Accident Investigation Committee is, as it were, a final measure, or one of the last control

measures used, and does not come into action until there has been an accident or a near accident. Long before this step was taken, we endeavor, through the use of the Unsafe Practice Report and Report of Safety Meetings Held, to exercise definite control and supervision over the safety performance of the foreman.

In Republic Steel Corporation we call violation of any safety order or the commission of any unsafe act, an "Unsafe Practice," and to correct unsafe practices, we use an Unsafe Practice Report form, which is printed on distinctively colored paper. This report is directed to the superintendent of the department in which the man committing the unsafe practice is employed, and it is signed by the individual who observes the unsafe practice.

This report reads as follows:

"In compliance with bulletin issued requiring that reports be made to you of all:

"Failures to keep safety appliances in good condition;

"Failures to use the safety protection provided;

"Failures to obey the safety rules; and

"Indulgence in unsafe practices.

"I have the following to report:"

Space is then provided for a detailed description of the act. Following this is additional space for recommendations by the observer and finally there is a place for the superintendent to note the action taken because of the reporting of the unsafe practice, and this disposition is addressed to the attention of the district manager and signed by the department superintendent. Copies of this Unsafe Practice Report are made and sent to the following: One to the safety department for record purpose, one returned to the man originating the report, so he can see that action has been taken on his report, one kept on file in the department, and one posted on the bulletin board in the department in which the unsafe practice was committed, the idea being that besides correcting the individual involved, others in the department through reading these unsafe practice reports, together with the suggestions and recommendations, become familiar with what might be termed unsafe acts, and they also learn the safe way in which certain acts can be performed.

Each week at the plant operating meeting, the safety department furnishes the district manager for discussion with the other department heads, a report showing the number of Unsafe Practice Reports turned in by each department during the past week and showing the number of foreman who turned in reports that week. An effort is made to have each foreman turn in at least one Unsafe Practice Report each week. It is our experience that when our total number of Unsafe Practice Reports turned in starts to decrease, we are coming to the point where there will be one or more lost time accidents. Thus our weekly and monthly report of unsafe practices acts as a barometer of our safety performance.

Considerable emphasis is also placed on the importance of the foreman, supervisor, or group leader holding frequent short safety meetings with his men to make sure that they all understand how to perform the work they are to do safely. Every man is in at least one safety meeting a month and most of them in one every week. A record is kept by the safety department of the number of safety meetings held by each foreman each month and that check, combined with the one on unsafe practices, gives a good indication of how a particular foreman is doing in the way of carrying out the safety program in his work. A foreman who holds few safety meetings and turns in few Unsafe Practice Reports will find it doubly difficult to explain how a man got hurt in his group when a lost time accident takes place. A foreman who has the safety of his men at heart also finds that by making frequent inspections of his department and reporting his findings, he is able to correct many little items that may lead to trouble, causing problems hard to overcome if not corrected when they occur or are discovered.

Of course, the best control measure of all is that which is exerted by the district manager on behalf of top management, on the department heads who in turn carry the message of safety to their departmental supervisors who are held responsible for the safety of the men working under their direction. In the proportion that management is sold on safety and its benefits and savings and insists on cooperation and efforts to prevent accidents, to that degree will the entire operating force be filled with enthusiasm and direct their energies toward keeping men from being

hurt by teaching them to work safely and supervising them so that they do work safely.

And when I speak of the foreman teaching their men to perform their daily work safely, I naturally lead into the last section of my subject, that of safety instructions and regulations.

The basis for the safety instructions and regulations in use in our plant consists of the twenty-two General Safety Orders and five Rule Books. They are rules and regulations drawn up over a long period of time out of the experience of practical working men as the best way to do certain specific kinds of work without accidents. They are brief and to the point and yet leave considerable latitude for the supervisors to make use of their own common sense and good judgment in planning the jobs to be done. Violations of the General Safety Orders and Rule Books, as might be expected, meet with quick and firm criticism although no effort is made to classify each Unsafe Practice Report under the heading of a particular General Safety Order or section of a Rule Book.

One unwritten "law" of a safety program is that of production with safety - by this I mean that if a man considers a job unsafe for him or his fellow workers, he should be trained that he is not required to do it until the methods of doing the job are made safe. This means a craftsmen does not make a lift he considers unsafe. A foreman or group leader may refuse to permit his men to work in unsafe conditions. A job may be shut down because a guard is broken or an open hazard exists. In practice however, it is found that these occasions seldom arise and this authority rarely exercised because the supervisors plan the jobs they are to do safely and instruct their men properly so that each one knows what he is to do and what his fellow workers are to do and will be doing at the same time he is doing his part, and in that way misunderstandings are reduced and safe working habits formed.

THURSDAY AFTERNOON SESSION

October 9, 1941

Physical Fitness As an Aid to Increased Production

By DR. J. H. CHIVERS

Medical Director, Crane Company, Chicago

It has been an established practice in many industries to examine each applicant for employment and rate him against a given standard of physique. If, in the opinion of the examining doctor, the applicant is physically fit he is approved for employment. The purpose of this examination is three-fold:

First: To determine whether the applicant is suffering from any physical impairment which would be aggravated by the nature of his employment and thereby predispose him to disability or disease.

Second: Whether he has a physical impairment which restricts his capacity to do the job and thereby renders him liable to accidental injury or illness.

Third: Whether he has a physical impairment which would subject his fellow workers to injury or disease as a consequence of his employment.

After the man is employed the question of physical fitness becomes largely his own concern and responsibility and industry's consideration becomes generalized on problems of working environment, hygiene, sanitation, fatigue, sometimes extending to problems of diet, housing, recreation and public health.

The physically unfit employee has frequently been regarded as an individual problem and whatever responsibility industry has assumed in his behalf has been done in the relationship of doctor to patient, or social service worker to employee. Under this plan there has been gradual but definite progress made in the interest of those employees physically handicapped for the demands of ordinary employment.

These are not ordinary times. Throughout the nation industrial management has received a challenge to "open the gates and operate at full speed." There has been a sudden and urgent demand for the expansion of plants—idle factories have been placed in operation—new plants constructed. Workers of all kinds are needed and to a large extent the supply must be drawn from those who have been idle or engaged in various forms of work-relief. The effort to maintain a production ahead of schedule calls for continuous maintenance of heavily worked machinery and equipment, for longer hours of employment and for a definite step up in individual production. Thus we find new employees and many old employees trying to adjust themselves to the demands of strenuous and unaccustomed work with longer hours of employment and harder manual effort. It was recently said—

"A definite responsibility is now placed upon industry to demonstrate American ingenuity and skill—not only in doing a job well, but also in doing it safely, efficiently and economically."

The physical examination of applicants for the purpose of placement in relation to the welfare of the individual as well as to the interests of the employer has been a routine procedure. Manifestly, when help has been plentiful we have tried to use foresight and to prove for employment only those best suited to the demands of the job. Too frequently we have resorted to inflexible insurance rating standards on age, weight, blood pressure, physique, etc. Because we have been able to separate selected and experienced workmen our records show a rather constant relationship of accident frequency to the job and the incidence of occupational disease to recognized hazards of employment.

But things are proving different now. The immediate and unprecedented demand for skilled labor and common labor has made many of us reconsider the standards of physical requirements with which we have approved employment of persons during the past ten years. We are lucky now if we can get any help, let alone looking for the near perfect physique. Cautiously accepting many of those we are now considering we hesitate to approve for employment those men, seven years ago. However, we note that their blood pressure has not changed; their lung findings show no appreciable difference and someone else has had the benefit of their employment since we last saw them. I am becoming more and more convinced that the physical handicaps which are aggravated by employment are very few. Instead of placing the emphasis on the selection of men for the job, we should now bend our efforts toward elimination of those factors in employment which predispose disability and shorten a man's working days. There is more and more need of direct medical supervision of the working environment and cooperation of industrial physicians with those engineers who plan the practical means of eliminating and controlling the hazards of employment.

If you want to know how the human machine is getting along have it overhauled periodically just as you do your automobile or shop machine. Many organizations are requiring periodic examinations of their men to determine their fitness—to catch the disease and destructive processes in the early stages and to know just how much dependence can be placed on the individual.

For many years the average age of the American population has been increasing and there is every indication that this trend will continue in the future. If we consider 65 as the threshold of old age, there were at the beginning of the century 3,000,000 persons or 4.1 per cent of the total population in this bracket. Today there are 9,000,000 or 6.8 per cent of the total population so classified. Manifestly, these changes will profoundly affect our economic and our industrial life. Aging has recently been recognized by the American Medical Association as an industrial health problem. Particular study is being made of those diseases of middle life and the influencing factors of employment which tend to decrease a man's working ability between the ages of forty and sixty. Questions naturally arise as to whether or not high blood pressure, coronary disease, arthritis and some of the other progressive diseases of middle life are more than casually related to the nature of a man's employment.

Effective medical service in industry should be a personal, individual service and it cannot be put on a piece work basis or time-study schedule. Effective medical control demands adequate personnel to render individual care to every employee who needs such service as comes within the scope of the du-

ties of that department. It is my opinion that there is nothing that will breed dissatisfaction or disdain in an employee quite so quickly as haphazard, rushed, ill-attended medical care. Every sick employee—every injured man comes to the doctor with an individual problem more important to him at that time than is any company problem, and it is within the power of the attending doctor to send that man back on the job confident that the needs of his well-being have been properly considered.

You cannot expect a doctor to make 40 to 50 physical examinations day after day and yet give proper consideration to each examination on its own merits. And you should not expect a doctor or nurse to have patients for surgical redressings standing in line to be taken care of from 8:00 A. M. to 4:00 P. M. —five days a week. Personal service cannot be rendered on a mass production basis. The medical service in every industry should be studied periodically as regards all routine and individual procedure. In view of the present pressure of production demands, appointments and redressings in your medical department should be scheduled as much as possible to prevent the clogging up of the waiting room. Employees do not choose to waste their time waiting for the doctor. Twenty men waiting twenty minutes is 400 minutes of lost production, most of which might easily be avoided by a little careful planning.

For a moment let us consider the small plant where there are from 75 to 300 employees and the compensation liability is carried by an insurance company. In a typical instance we find that a designated doctor in the neighborhood is placed on a call basis for emergency service only. He makes his report direct to the insurance company and he has very little contact with the industry or the management. The fact that medical service to 85 per cent of our workers is predominantly in the hands of private physicians presents an important problem to management and to the medical profession to work out an effective program of cooperation and coordination of effort.

During the past few years the medical fraternity throughout this country has recognized the importance of industrial hygiene and has given special consideration to measures for the promotion of the health of our working population. Today the private practitioner in the neighborhood of your plant is looking for an opportunity to render service to you and to your employees for the prevention of occupational diseases and the promotion of health.

May I suggest that the management of any small manufacturing plant take the initiative and arrange an informal meeting with the doctor in your neighborhood who is on call for emergency service. Quite possibly a representative of your insurance carrier would be glad to participate in that meeting. Have a frank discussion of lost time accidents and illness among your employees; the cause; the effect; and the remedy. If you don't have the figures, it is my opinion the insurance company can supply sufficient data for such discussion. I feel certain that all concerned, including the employees, would benefit by an exchange of opinions and facts.

If your medical contact is entirely outside of the plant, but there is need of a first-aid room in your factory, I can assure you that there are now available many competently trained graduate nurses who can take over the responsibilities of a first-aid room in a factory and can prove themselves most worthwhile in their particular field of study. An experienced industrial nurse is able to recognize a case that is a potential liability to her company and she can advise the management accordingly. She recognizes when an employee should not be at work, and when the advice and care of a physician is indicated. She knows what not to do as well as what she should do.

An Educational Safety Program for Foremen

by V. E. PERRY

Director of Training, The American Rolling Mill Co., Middletown, O.

We can't hope to cover here *all* the basic principles which a man must comprehend before he can rightfully lay claim to the title of foreman. But, we can emphasize a

fundamental fact of human relationship that any man must have if he is going to succeed in handling people.

This fundamental fact is: *A complete realisation that the method that will help him most to discharge his obligations is to always be sure that he is keeping the other fellow's viewpoint in mind.*

His men are interested in themselves and their own problems. The ideas which the foreman presents to them arouse their selfish interest only to the degree that they harmonize with the desires, wishes and cravings that *they* have. They are interested only in what will get *them* more out of life. And this is as it should be; intelligent selfishness is being absolutely unselfish in our dealings with other people. In other words, the foreman will get more from his people if, in his dealing with them, he gives them what they want from life.

Let's see how we can use *practically* that idea in developing an educational safety program for foremen.

Some of the things a man wants from life are: the desire for good wages; the craving for recognition as an individual; security and comfort. Let's take one of them and illustrate what is meant by *talking from the other fellow's viewpoint.* We will show first how one man endeavors to do this and runs up against a stone wall since the man doesn't want to wear safety shoes because they are uncomfortable. In the next place, we will show you how this might have been successfully handled by keeping in mind that no matter what comes up, the man's viewpoint is going to be adhered to.

Demonstration

Situation: A foreman who is anxious to have all his men wear safety shoes has called one of his crane leaders, who is an old and loyal employee, into the office and the following conversation takes place.

Foreman: Lew, I have been thinking about the kind of a job you have. Besides being one of the key jobs in the department, it is also one where you are continually liable to the unexpected. A packlifter may not do as you expect; you have to be sure your feet are in the clear *and* that you are always alert and on your toes. That's right isn't it?

Lew: Yes, you always have to be wide awake; there are lots of things to watch out for.

Foreman: You sure do, and that's what I've been thinking about. If there is some way we can figure out how to eliminate some of the *hazards* of your job and be more sure of your being *on* the job all the time, we would have made a big step forward. That sounds reasonable, doesn't it?

Lew: I'm for that, all right.

Foreman: Well, here's the idea. We *can* eliminate some of the hazards and keep that old pay check regular besides having you here all the time if you would get yourself a pair of safety shoes. Most people find that they are comfortable and last a long time and after a while they wouldn't do without them. How come you don't wear safety shoes?

Lew: Well, I've had a half dozen pairs at different times and I just can't wear them. They hurt my feet and anyone who does as much walking as I do just can't stand to have his feet hurt.

Foreman: Hurt your feet? Well, I don't see how many people can wear them if you can't. Maybe we will have to find you another job, but I'm going to have to insist that all my crane leaders wear safety shoes. I don't want to seem unreasonable in this, but we have a fine safety record and I want to be sure we do everything we can to keep our record clear.

Lew: Well, I don't want another job, so I'll get me a pair today and try them again.

Foreman: Thanks, Lew; I knew you would go alonge with me on this thing and I hope they don't hurt your feet.

So the foreman, satisfied that he done his part and had been reasonable about the thing, dismissed it from his mind. Lew wore the safety shoes for a couple of weeks and they hurt his feet so badly he put his other shoes back on. A few days after that he was placing an angle iron for a load he wanted to sit down and he let it slip. The angle iron fell, struck him on his toe and broke it. The man had a painful foot, his family had no breadwinner for a few weeks, it cost the Company money for the accident *and* the record was broken. The foreman thought Lew had let him down and there were strained relations between them when Lew came back to work.

That's putting the emphasis on the system rather than the individual. That is not talking from the man's viewpoint. Now there is no question but what this foreman felt badly about the man being hurt and this would be greater if the man had been hurt more seriously *but* the thing that upset the foreman the most was not being able to show that his department had a good safety record.

Situation: Let's take a look now at the way this same situation would be handled if the emphasis were put on the individual, rather than the system.

Foreman: Lew, I have been thinking about the kind of a job you have. Besides being one of the key jobs of the department, it is also one where you are continually liable to the unexpected. A packlifter may not do as you expect; you have to be sure your feet are in the clear and that you are always alert and on your toes. That's right, isn't it?

Lew: Yes, you always have to wide awake; there are lots of things to watch out for.

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Lew: Well, I've had a half a dozen pairs at different times and I just can't wear them. They *hurt my feet* and anyone who does as much walking as I do, just can't stand it to have his feet uncomfortable.

Foreman: Is that right? Well, I don't blame you then for not wanting to wear them. I wouldn't want to wear them either. No one on your job wants feet that hurt. What seems to be the matter with them?

Lew: Well, the end of the reinforced toe of the shoe digs right into my toes, wears out my socks and makes my feet sore and I just can't wear them.

Foreman: I see. The only thing that I don't see is how all these other fellows wear them then if they hurt their feet too.

Lew: They don't hurt their feet. They have told me so. I want to cooperate on this but I just can't wear them. I guess my feet are different.

Foreman: I wonder if it would be asking too much if you would show me your foot; take off your shoes and sock, will you? Here, use this piece of paper, the floor might be dirty.

(Man takes off shoes and sock. Foreman carefully looks at foot, noticing how toes are bunched up.)

Foreman: What size shoes do you wear?

Lew: A seven. I've always worn that size.

Foreman: (Picking up ruler from his desk) I wonder if you would mind standing on this ruler? (Pushes down on toes to straighten them out) Lew, do you know your foot measures for a nine?

Lew: Yes, I know. They always tell me in the shoe store that I should wear a longer shoe, but I have always worn a seven and they seem to feel the best.

Foreman: They do, eh? (Meditating) You know, Lew, I am thinking I would like to try a little experiment with you. Let's you and me go over to the Safety Department and look at their shoes and I'll tell you what I would like to try. I'll buy you a pair of safety shoes *and* decide what size to get. Then you try them and if they hurt your feet, take them off and give them away and *I'll* pay for them. If they don't hurt your feet, you keep on wearing them and *you* pay for them. What do you say, is it a go?

Lew: Oh, I'll try them, but I know it won't work. I've tried too many times before.

Foreman: Well, I'm willing to take a chance. Let's go.

They went to the safety department and bought the shoes, size 9-B, and the crane leader wore them. After a couple of days he said that he had to admit the shoes felt fine and he would have to try some street

shoes that size. The department continued without an accident; the man was well and whole, and the relations between the Foreman and Lew were better than ever.

This foreman, by keeping his attention on the man and his problems, rather than on the system, accomplished his purpose with this and other men and kept his department running smoothly and efficiently.

Now, let's think about these two ideas. In the first one we see the foreman talking in terms the man is likely to understand, and in normal circumstances stands a pretty good chance of succeeding. We saw, however, that he ran up against what seemed to him an insurmountable obstacle in the fact that the shoes were not comfortable and it seemed to this foreman that it was one man's opinion against so many other as to whether or not these shoes *could* be worn. So he fell back on his authority and while he gained the temporary point of this man wearing safety shoes, he failed in the long run of preventing his men from hurting their feet.

In the second case we saw the foreman so interested in his man's welfare that when he ran into the obstacle "uncomfortable," instead of trying to force the issue, he thoroughly investigated it and removed the cause of the discomfort and the man was willing to cooperate.

In thinking about these two cases we must recognize two things. The first man might have honestly thought that he was doing everything he could to talk in terms of the other fellow, *but* he didn't have this idea inculcated in his own mind so that it would operate when the going was tough. He fell back on his authority which he thought would do the trick. He was mentally near-sighted. The thing he thought he was trying to do was to get Lew to wear safety shoes, when in reality what he was attempting was to make it less likely for Lew to hurt his feet.

Well, so much for the first one. Now, let's look at the way the second foreman tackled the pob. He honestly and completely thought of this situation as being one in which he thought of his men, how he could prevent them from getting hurt. Not because it would help his safety record, not because it would save the company the cost of the accident, but because he was genuinely interested in them. And he knew the best way to do that and have them be happy and contented on their jobs was to get himself in the frame of mind that his men's interests were more important to him and to the company than anything else. This does not mean that these are contrary to the company's interests.

In both cases the company's wishes were to have the department operated in such a way as not to have accidents. Why do they wish this? What do they have on their mind? The management has learned over a period of years that the efficient department or plant is the safe department or plant. I expect too, that when they take into consideration the feeling of the people of the organization, they know we are not going to have an efficient plant if we have people in it who are *uncomfortable* because they are wearing shoes that are not suited to them. On the other hand they know that safety shoes prevent or minimize a certain type of accident. The problem for the foreman resolves itself *then* into getting the men not to simply wear safety shoes, but to wear the kind of safety shoes that are adapted to the man's foot. And if there is a case which I haven't thought of, where the man couldn't be fitted, it would be better to have the man go without safety shoes rather than have him wear uncomfortable shoes and blame the Company.

Now what we have been trying to do here is to impress on our minds that *any* situation can be handled by talking to the man from *his viewpoint* and you can work out the answer in that way.

An Educational Safety Program for Employees

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Not long ago a study of some 10,000 employees determined statistically that those who had many minor accidents in their six months probationary period were almost a "sure bet" for a lost time accident later during their employment.

In like manner, in making a study of employees whose departments were farther removed from the first aid stations than others, it was shown that the availability to the hospital in distance was the predominating fact as to whether the individual sought first aid treatment or not.

In both of these cases individual training and an educational program would have reduced this laxity.

Many companies have recognized this technique of individual treatment and have devised methods of approach. We in Carnegie-Illinois Steel Corporation have used not only those proved techniques of the past, which are usable today, but have devised new methods which meet the contemporary need of the times. The defense program with its great numbers of new employees has stepped into high gear this need for individual contacts and individual treatment of employees to aid in accident prevention. In order that this subject be approached from a specific point of view let us take our method of training a new employee upon his induction into our plants.

Education Begins at Once

When the employee has been interviewed, taken his physical examination and is ready for placement, he is taken into a meeting room with the other individuals who are to start work that day. The director of safety, or one of his assistants, spends approximately one-half hour with new men, discussing the general plant safety rules, answering specific questions and doing what he can in that short period of time to introduce the new employee to the safety policy of the company.

Each employee is then conducted to the department in which he will work. Here he is introduced to the superintendent or assistant superintendent, and again safety is discussed with him. This time the approach is departmental rather than general. The employee is next conducted to the foreman of the division in which he will work. If he is an experienced employee who can immediately begin the operation, the foreman points out the hazards to be encountered and does a short intensive job demonstration to be sure the employee is aware of these hazards. The employee is introduced to other employees in his immediate vicinity, and these employees are asked to look out for the new employee's welfare after the foreman or job trainer is satisfied that the employee can function without assistance. In a department in which size prohibits the foreman from taking time to start the new employee, job trainers are present who do this function for the foreman.

If the new employee is inexperienced at his new job or has not performed the job for some time, either a "buddy" will be selected to watch over him or, if the department has a job trainer, the job trainer will see that he learns the job sequence in the safe manner. In some cases where the type of work warrants, vestibule schools are set up to teach the new man or woman the skills necessary before he or she is allowed to work at the normal operating speed. Vestibule schools are those in which space has been set aside for educational and training purposes. Actual working conditions are duplicated as closely as possible and the new employee learns at a rate of speed comparable with his ability. When he reaches the degree of skill which is required in actual operations he is transferred to his permanent job.

In a recent study made by United States Steel Subsidiary Companies to pool their methods and techniques of aiding the experienced worker to work safely, 36 different methods were listed which could be used for this purpose. Only a few of these can be discussed here.

Job Training

Probably the one most important is that of job training. The first step must be the job analysis. Experience has shown that the best analyses are made by experienced workmen in cooperation with their foreman. This analysis should then be reviewed by an experienced industrial engineer, in order that the work sequences be in proper order and methods and motion studies correctly analyzed. These studies should be much more in detail than when determining rates or even in studying methods, since it is this analysis which is to be used to train the new employee in the proper job sequence. Training should be done by a job trainer if he is available. It can be done by an experienced workman or a foreman if necessary.

It is during this analysis and study that the job hazards are determined and are so indicated that when the employee is being trained

he will be taught to avoid the hazards. The actual training is done in several ways. The departmental job trainer may be used full time with the employee until he is satisfied that the employee can go on his own. A second method is to put the new employee with an experienced workman who himself has been properly trained. We should be sure, however, in using an older employee to train a new employee that he does not learn the bad habits of the older employee. A third method is to place the new employee as a helper and have him assist on subsequent operations, taking advantage of an opportunity from time to time to learn to avoid the hazards present.

There comes to mind a maintenance foreman who at the start of each turn groups his men to do the assigned jobs, goes over quickly with each group the hazards to be encountered on the job and distributes the safety equipment necessary for the work. Needless to say, this foreman's accident record is excellent. Irrespective of the method used, if the analysis is properly made, if the job hazards are determined and the employee trained to perform the work by eliminating the hazards, accidents cannot help but be reduced.

Recently at a plant in the middle west where the accident fatality rate was quite high the general superintendent called his top supervision together in an effort to stop major accidents. The meeting lasted only five or six minutes, but during that time the general superintendent tersely instructed each one of the 60 odd supervisors present to contact personally each man under his supervision within the next 24 hours and discuss safety with him. This was, of course, quite a task, but it was done. In the next 30 days, in that plant of 22,000 people, there were only two lost time accidents.

Next to job training, individual contact probably is the most effective method of employee safety training. This can be done in numerous ways. One director of safety comes to mind who for some time has made it a practice to contact five people each day and discuss safety with them. The technique as generally used is for the foreman, if he has a small group, to contact each man once a turn; if he has a large group, to set a definite number which he will be able to contact each turn. The foreman may use this contact to discuss job hazards or it may be used to allow the employees to tell the foreman some of the employee's safety problems. The foreman can use this material in his own safety meetings to advantage.

Regular printed forms are used permitting the foreman to report at the end of each turn the men whom he contacted during the day and with whom he discussed safety. In some plants the form used indicates opposite the man's name the type of safety talk given. Seemingly the very fact that the foreman has taken the time and the interest to discuss with the employee the employee's safety is enough to cause that employee to be more apprehensive of hazards and to avoid them.

Unsafe Practices

Another training method which has been employed to good advantage is the reporting of unsafe practices. Employees are trained to look for unsafe practices, correct them and to report them regularly. Experience has shown that the more unsafe practices an employee finds, the safer worker he is.

In one plant 3,000 unsafe practices were reported in one month. This has continued over several years, the number of unsafe practices varying from month to month but always of considerable number. The fact that this plant has consistently shown a frequency below the company average and at times leads 17 other plants in the reduction of injuries, gives some indication of the effectiveness of this technique.

When this educational aid was first instigated there was a general feeling that reporting unsafe practices was indicative of both unsatisfactory management and working conditions, and that the more unsafe practices reported, the less efficient was that department. When the employees finally realized that unsafe practices were present under any circumstances; and it was the department which was seeing them and doing something about them that was showing the best results, this technique of training gained in popularity and effect.

Huddle Meetings

Huddle meetings have been quite effective as a means of employee training. This is patterned, of course, after the football huddle in which the individuals stand around in a circle and confer. Generally this is done when start-

ing work, the foreman taking a few minutes at the beginning of the turn or while the men are waiting to take their assigned places. At each turn a different subject is used and discussion is quickly and concisely entered into, followed by the men going to their respective jobs. Experience has shown that it is not so much the subject discussed as the fact that turn is started with safety on the men's minds that makes it effective.

In several plants the huddle is led by employees. In one plant an employee was cited for outstanding performance for the manner in which he led his department huddle meetings. Much can be done in a quick, intensive approach to the safety problems of the department just prior to going to work.

Apprentice Training

Apprenticeship is an almost ideal method of safety training of employees. The apprentice realizes that he is in training program and is very receptive to suggestions, making it less difficult to train him to do the job in the proper manner. In our company there are nearly 900 apprentices in the trades and 250 college graduates in training. The accident frequency experience for these groups is low.

In order, however, for this type training to be effective the jobs must have been analyzed, hazards known and indicated clearly in order that the boys in learning the proper sequence will also learn to avoid the hazards. Just to train a boy by turning him over to the "old timer" to learn from the workman is not enough. As mentioned before, this may result in teaching the new employee the bad habits of the old employee.

Visual Education

Although considerable work has already been done in this field, it still is in the experimental phase and much can be done in sound movies, sound slide films and other types of visual education to further training in safety. Although we have sound slide films as issued by various commercial companies from time to time, it is felt that this approach should be much more personalized.

For example, the general safety rule book could be the basis of a sound slide film in which the rules are illustrated and discussed. The new employee and the experienced employee would have an opportunity to visualize actual conditions while he was learning the accident hazards which he must avoid. Another method used to advantage is the issuing of photographs of unsafe practices to groups of employees. Each member of the group is asked to select the unsafe practice in each photograph. Around this is built a discussion to determine what is wrong and what should be done to correct the condition.

Just recently a color sound movie was used to educate the employee and his family in the use of proper eating and proper bodily care for the elimination of heat cases. The medical profession generally is in accord that industrial heat cases are more a matter of proper diet and proper rest than exposure to heat. Investigation of heat prostration and heat cramps has indicated that it is a matter of what the individual had eaten just prior to coming to work, rather than the degree of temperature in which he was working. These are the things which the film entitled "Beat the Heat" portrays. As the film progresses the proper foods to eat, the foods to avoid, the need for bathing regularly, the need for sleeping properly are dramatically illustrated.

Much has already been done in industry to train the employee in first aid and artificial respiration. Not so much has been done, however, in training him in the use of oxygen equipment and other apparatus for working in gases, dusts, and other respiratory hazards. The Bureau of Mines has been of considerable assistance in this field by training individuals in the use of proper protection when working under unsafe conditions. Not only are the men instructed how to use the various pieces of protective equipment, but they are trained under actual operating conditions.

In one plant where this method of employee training has been used gas cases have been eliminated, although for years prior to this training, cases were numerous, several resulting in fatalities.

Regardless of the technique used, irrespective of the educational skill manifested by the teachers, the success of your educational program will be in direct proportion to the degree of participation by your top supervision. Several months ago we held a two day educational and training meeting at Gary, Indiana Attendance at one of the evening meetings aggregated better than five thousand supervisors. Speakers for that evening included

President Perry, Vice-Presidents Lose and Moore, Managers of Operations Hadley and Oberg and men of like caliber. Safety with us is practiced from the highest executive to the employee with the lowest skill.

Changing conditions both industrially and socially have required us to approach this important subject of accident prevention on a different plane. The trend today is towards individual treatment with a more analytical approach. In order for a company with a frequency of 3.5 to reduce that frequency, it becomes a matter of individual contact, of analysis of each job, of a program of training and education developed for the individual.

To those of you who are still using the overall group approach in analyzing and solving your safety problems, do not abandon your methods, but supplement them with a program relating to the individual employee, individual cases, approach the problem from the individual employee standpoint, personalize your program, and we feel you will get the results that you hope to obtain.

ADJOURNMENT